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Zohar et al.

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(54) **SYSTEM FOR FINDING WEBSITE INVITATION CUEING KEYWORDS AND FOR ATTRIBUTE-BASED GENERATION OF INVITATION-CUEING INSTRUCTIONS**

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Related U.S. Application Data

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(51) **Int. Cl.**
G06F 17/30 (2006.01)

(52) **U.S. Cl.**
CPC ***G06F 17/30864*** (2013.01)

(58) **Field of Classification Search**
CPC combination set(s) only.
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2003/0088554 A1* 5/2003 Ryan G06F 17/3061
2005/0267973 A1* 12/2005 Carlson G06Q 30/06 709/228
2006/0041548 A1* 2/2006 Parsons G06Q 30/02
2006/0253586 A1 11/2006 Woods
2008/0104031 A1 5/2008 Grasso
2008/0294624 A1* 11/2008 Kanigsberg G06F 17/30867
2009/0248484 A1* 10/2009 Surendran G06Q 30/0201 705/7.29
2010/0299319 A1* 11/2010 Parson G06Q 10/00 707/713

FOREIGN PATENT DOCUMENTS

AU 2006233245 A1 5/2008
AU 2006233245 B2 5/2008
AU 2010101252 A4 12/2010
AU 2010241403 A1 12/2010

OTHER PUBLICATIONS

International Preliminary Report on Patentability for corresponding international application PCT/IL2008/00709 issued Nov. 30, 2010 and International Search Report mailed Jan. 7, 2009.

* cited by examiner

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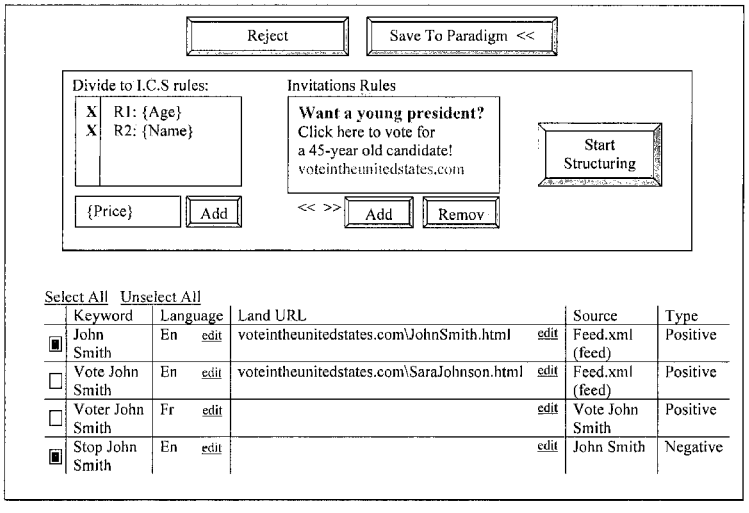
(57) **ABSTRACT**

A system for identifying keywords which may include a non-acquiescence information collector operative to collect information indicating, for each individual website from among a multiplicity of websites, at least one keyword which brought at least one user into contact with said individual website but did not result in a defined criterion for acquiescence of a user to at least one suggestion presented by said website; and a negative keyword definer operative to define at least one specific keyword which brought at least one user into contact with a specific website but did not result in a transaction between said user and said website, as a negative keyword for said specific website. Positive keyword extraction based on aggregation of visitor acquiescence information may be provided. Paradigm structuring may include template generation of invitations and/or attribute based generation of invitation cueing sets.

2 Claims, 19 Drawing Sheets



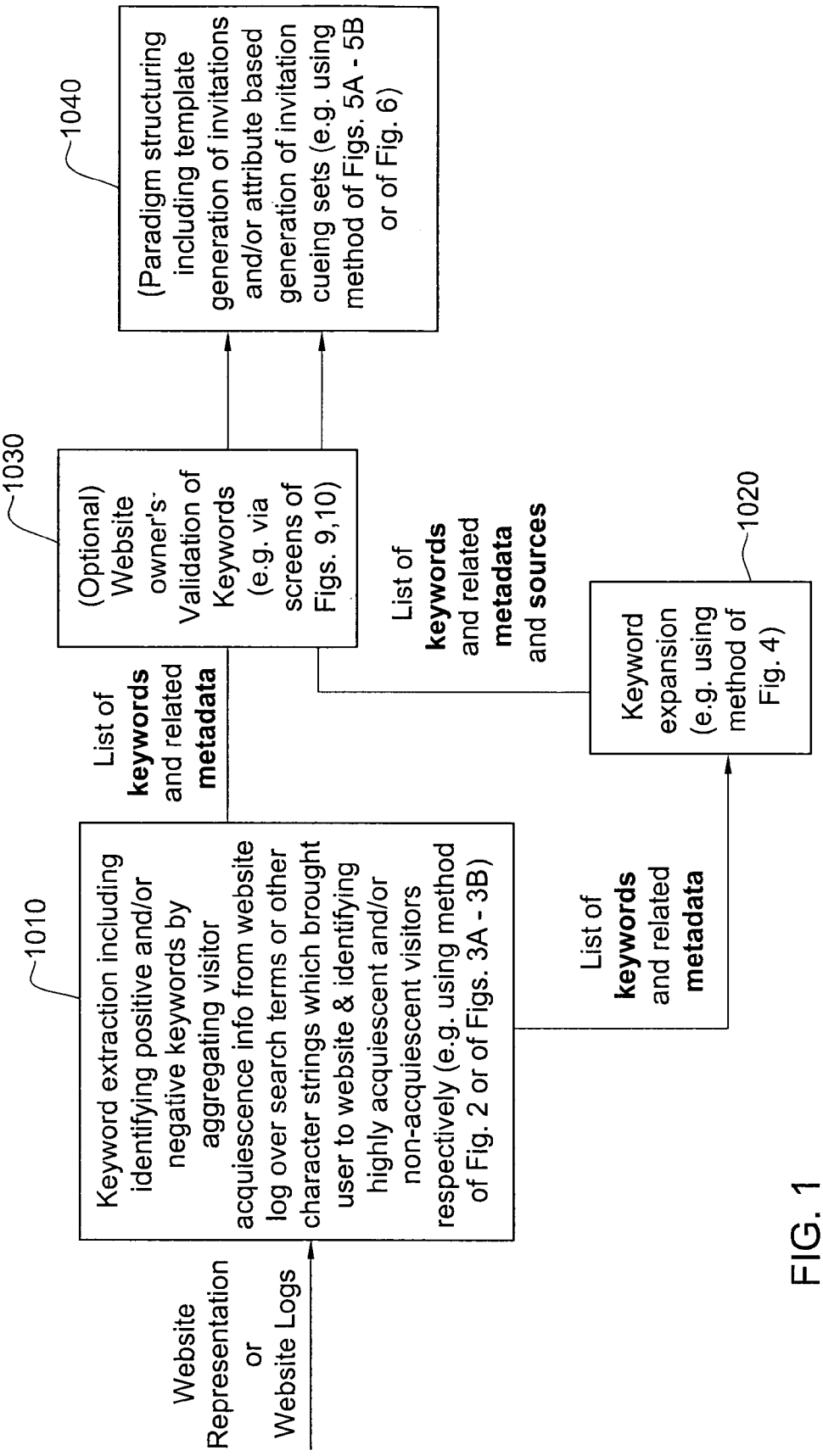

Website Representation or Website Logs
1010
Keyword extraction including identifying positive and/or negative keywords by aggregating visitor acquiescence info from website log over search terms or other character strings which brought user to website & identifying highly acquiescent and/or non-acquiescent visitors respectively (e.g. using method of Fig. 2 or of Figs. 3A - 3B)
List of keywords and related metadata
1030
(Optional) Website owner's Validation of Keywords (e.g. via screens of Figs. 9,10)
1040
(Paradigm structuring including template generation of invitations and/or attribute based generation of invitation cueing sets (e.g. using method of Figs. 5A - 5B or of Fig. 6)
List of keywords and related metadata and sources
1020
Keyword expansion (e.g. using method of Fig. 4)
List of keywords and related metadata

FIG. 1

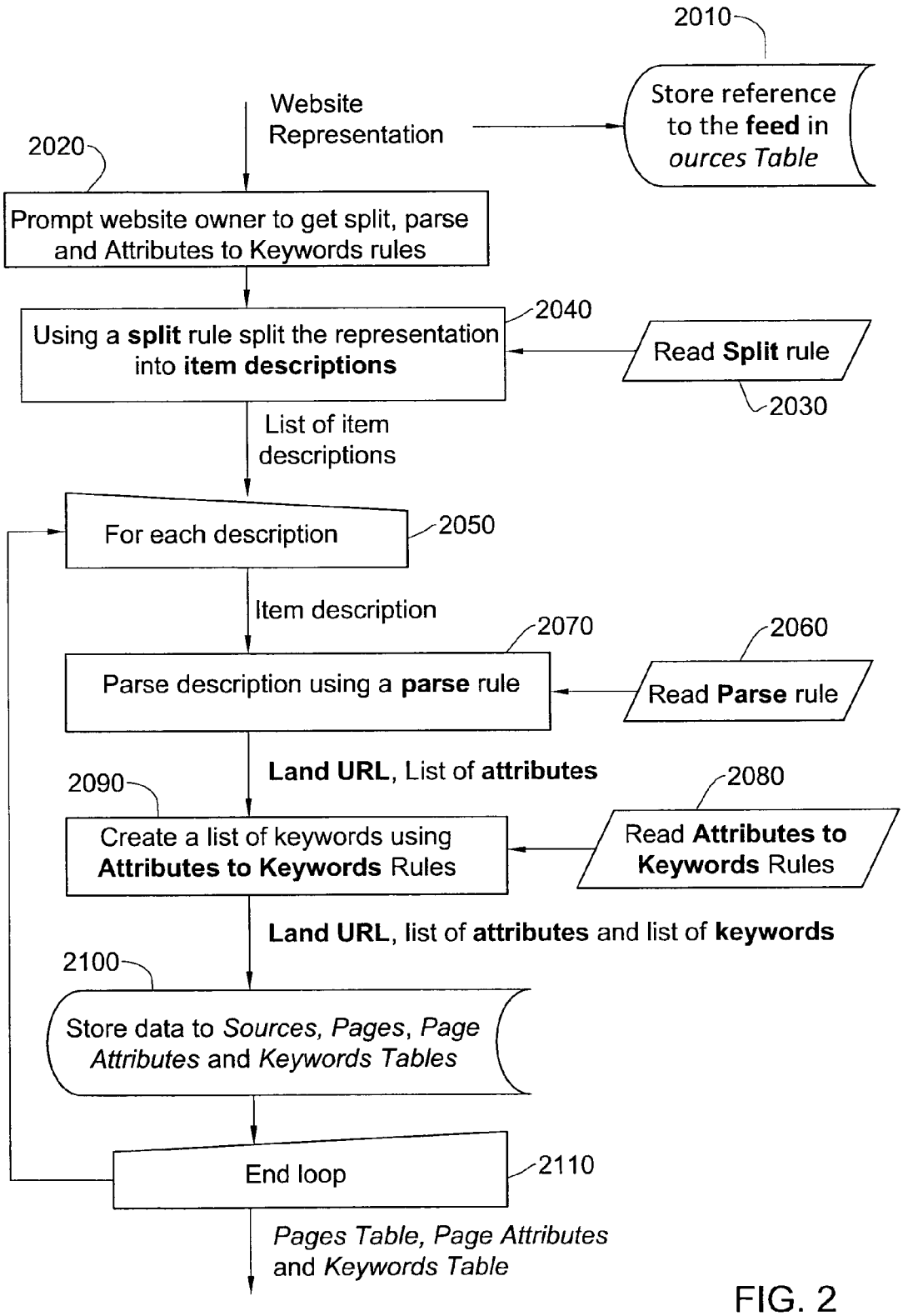

2010
Store reference to the **feed** in *ources Table*
Website Representation
2020
Prompt website owner to get split, parse and Attributes to Keywords rules
Using a **split** rule split the representation into **item descriptions**
2040
Read **Split** rule
2030
List of item descriptions
For each description
2050
Item description
2070
2060
Parse description using a **parse** rule
Read **Parse** rule
Land URL, List of **attributes**
2090
2080
Create a list of keywords using **Attributes to Keywords** Rules
Read **Attributes to Keywords** Rules
Land URL, list of **attributes** and list of **keywords**
2100
Store data to *Sources*, *Pages*, *Page Attributes* and *Keywords Tables*
End loop
2110
Pages Table, Page Attributes and *Keywords Table*

FIG. 2

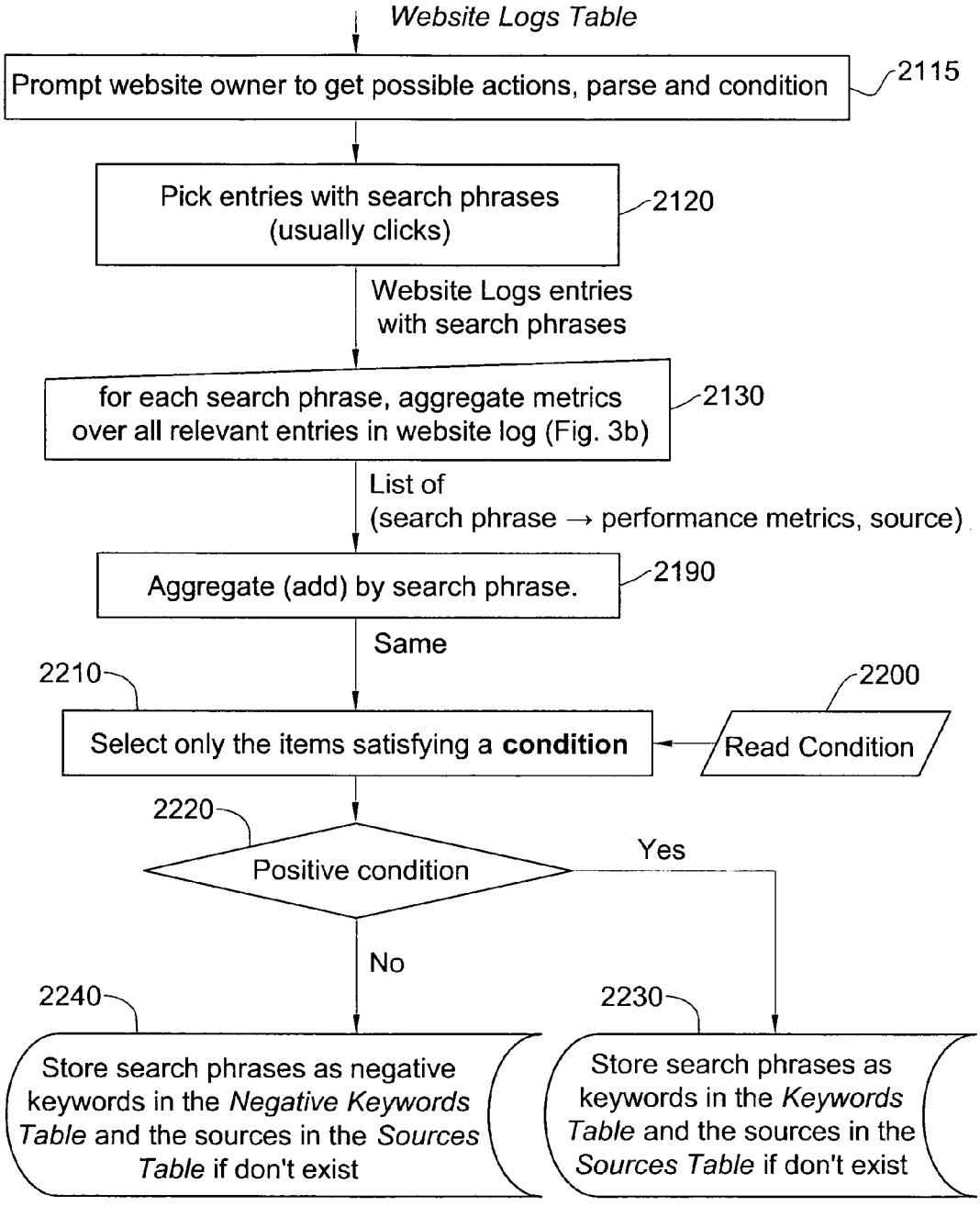

Website Logs Table
Prompt website owner to get possible actions, parse and condition
2115
Pick entries with search phrases (usually clicks)
2120
Website Logs entries with search phrases
for each search phrase, aggregate metrics over all relevant entries in website log (Fig. 3b)
2130
List of (search phrase → performance metrics, source)
Aggregate (add) by search phrase.
2190
Same
2210
2200
Select only the items satisfying a condition
Read Condition
2220
Positive condition
Yes
No
2240
2230
Store search phrases as negative keywords in the Negative Keywords Table and the sources in the Sources Table if don't exist
Store search phrases as keywords in the Keywords Table and the sources in the Sources Table if don't exist

FIG. 3a

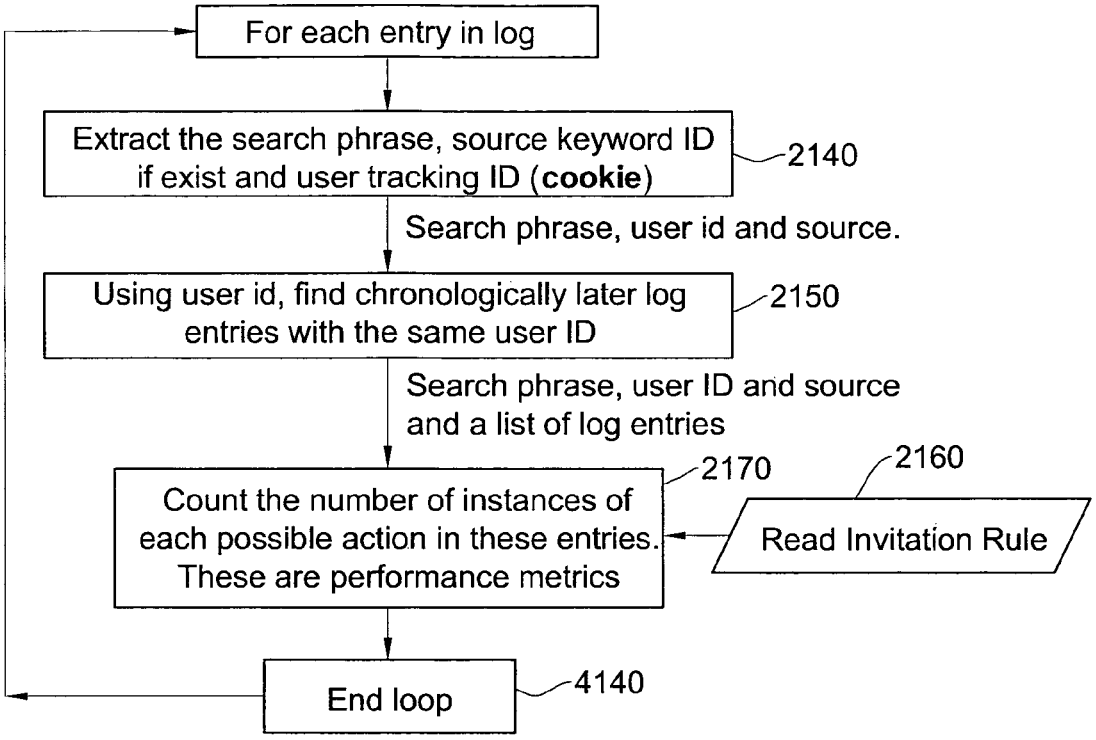

For each entry in log
Extract the search phrase, source keyword ID if exist and user tracking ID (cookie)
2140
Search phrase, user id and source.
Using user id, find chronologically later log entries with the same user ID
2150
Search phrase, user ID and source and a list of log entries
2170
2160
Count the number of instances of each possible action in these entries. These are performance metrics
Read Invitation Rule
End loop
4140

FIG. 3b

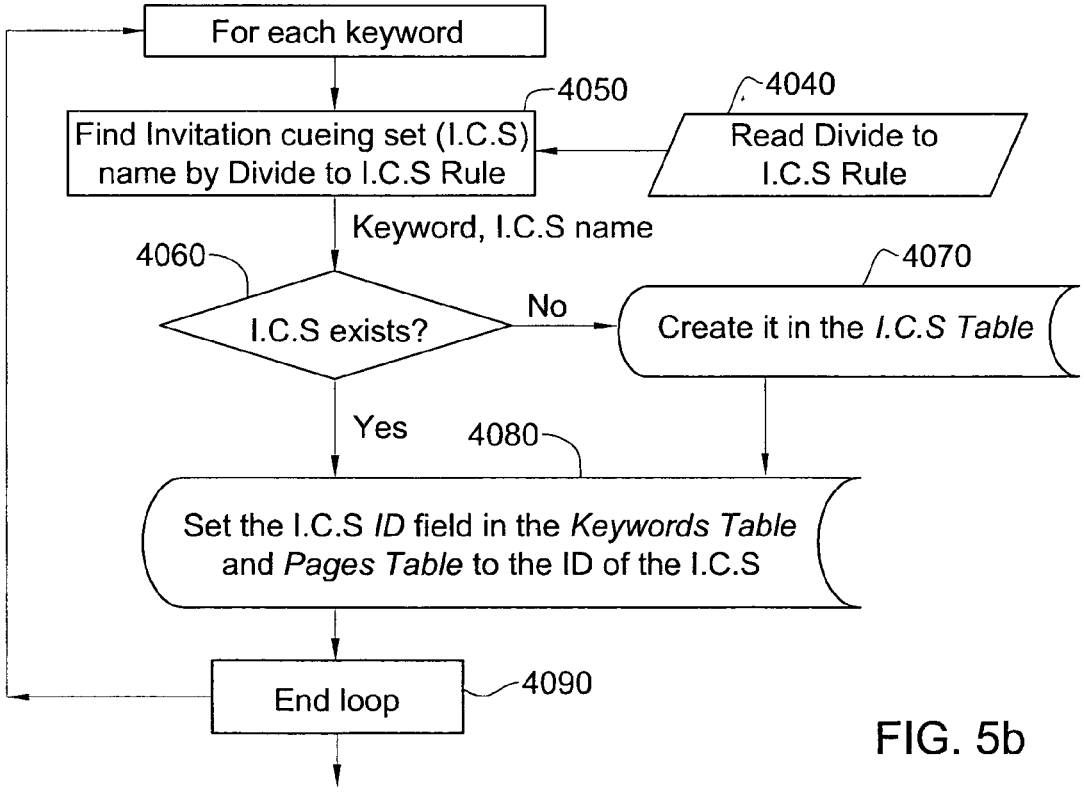

For each keyword
4050
4040
Find Invitation cueing set (I.C.S) name by Divide to I.C.S Rule
Read Divide to I.C.S Rule
Keyword, I.C.S name
4060
4070
I.C.S exists?
No
Create it in the I.C.S Table
Yes
4080
Set the I.C.S ID field in the Keywords Table and Pages Table to the ID of the I.C.S
End loop
4090

FIG. 5b

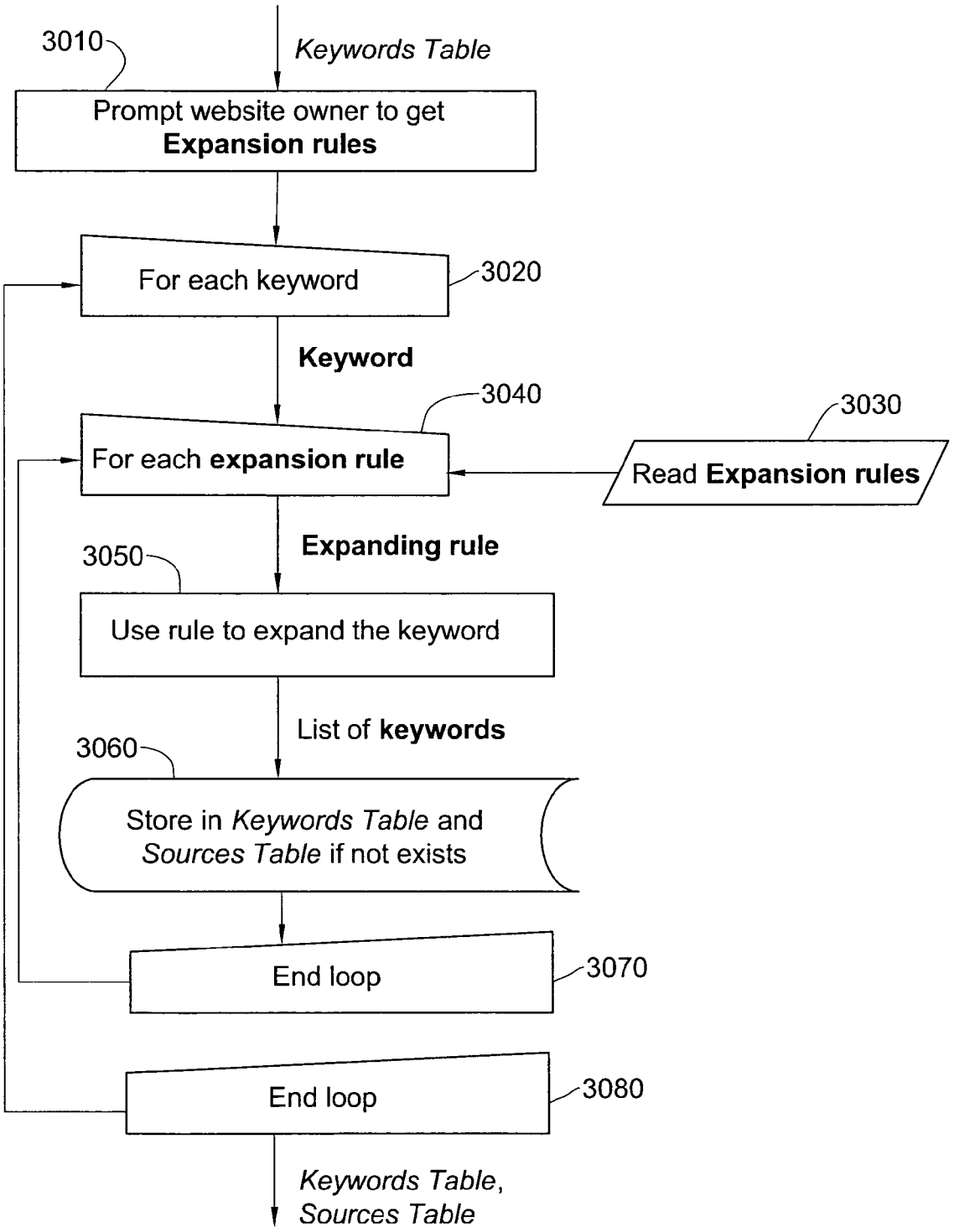

3010
Keywords Table
Prompt website owner to get Expansion rules
For each keyword
3020
Keyword
3040
3030
For each expansion rule
Read Expansion rules
Expanding rule
3050
Use rule to expand the keyword
List of keywords
3060
Store in Keywords Table and Sources Table if not exists
End loop
3070
End loop
3080
Keywords Table, Sources Table

FIG. 4

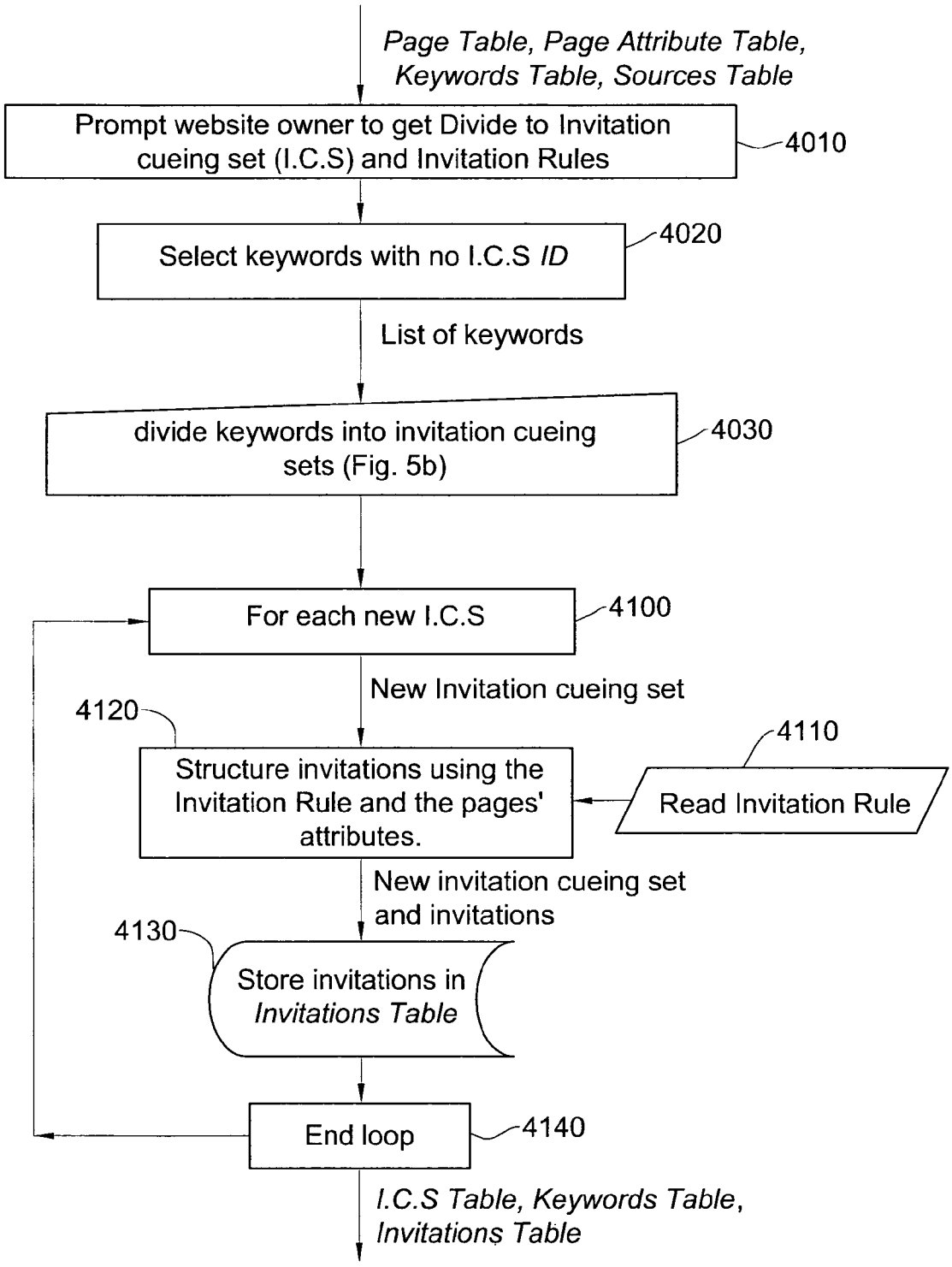

Page Table, Page Attribute Table, Keywords Table, Sources Table
Prompt website owner to get Divide to Invitation cueing set (I.C.S) and Invitation Rules
4010
Select keywords with no I.C.S ID
4020
List of keywords
divide keywords into invitation cueing sets (Fig. 5b)
4030
For each new I.C.S
4100
New Invitation cueing set
4120
Structure invitations using the Invitation Rule and the pages' attributes.
4110
Read Invitation Rule
New invitation cueing set and invitations
4130
Store invitations in Invitations Table
End loop
4140
I.C.S Table, Keywords Table, Invitations Table

FIG. 5a

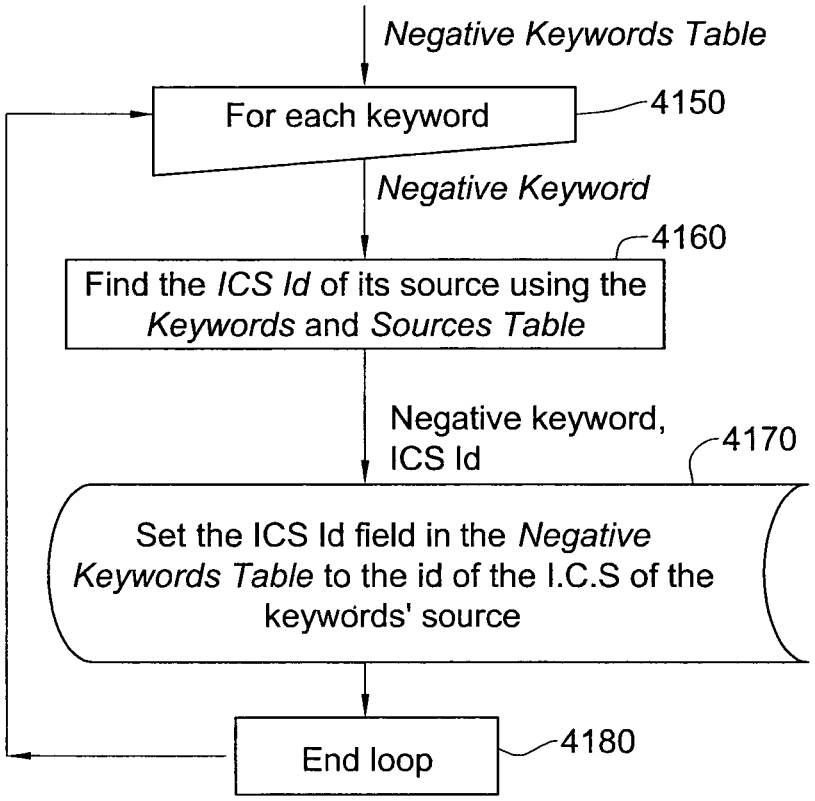

Negative Keywords Table
For each keyword
4150
Negative Keyword
4160
Find the ICS Id of its source using the Keywords and Sources Table
Negative keyword, ICS Id
4170
Set the ICS Id field in the Negative Keywords Table to the id of the I.C.S of the keywords' source
End loop
4180

FIG. 6

Field	Value	Description
Id	Integer	An identifying field for the page
URL	Text	The text of the keyword or the URL of the page
Language	A language code	
Source	Integer	The identification of the source which directly brought to this page
ICS Id		The id of the Invitation Cueing Set (I.C.S) for which this page is assigned

FIG. 7A

Field	Value	Description
Id	Integer	An identifying field for the keyword
Text	Text	The text of the keyword
Language	A language code	
Page Id	Integer	The page id (in the Pages Table) of the page this keyword is related to
Source	Integer	The identification of the source which directly brought to this keyword
ICS Id		The id of the Invitation Cueing Set (I.C.S) for which this page is assigned

FIG. 7B

Field	Value	Description
Page Id	Integer	An identifying field for the page which holds this attribute
Name	Text	The attributes' name
Value		The attributes' value
Type	Integer, String, Float etc.	An indication as to how to parse the value field

FIG. 7C

Field	Value	Description
Id	Integer	An identifying field
Type	'Keyword', 'Page' or 'Feed'	The type of the source
Content	Text	
Item Id	Integer	The id of the item in the relevant table (by type)

FIG. 7D

Field	Value	Description
Id	Integer	An identifying field
Content		This can span several fields and contains some format of the invitation information which the user can see
Redirection	Land URL	The target site of the invitation
ICS Id		The id of the Invitation Cueing Set (I.C.S) for which this invitation is assigned

FIG. 7E

Field	Value	Description
Id	Integer	An identifying field
Name	Text	An identifying string which enables a user to recognize the Invitation Cueing Set
GeoTarget	String	The geographical criterion for which this Invitation Cueing Set (I.C.S) is related

FIG. 7F

Field	Value	Description
Id	Integer	Identifier for the entry
Date	Date	The date-time of the request
Cookie	Text	A user identifying string
Referrer	Text	The URL of the referring site to this request
Keyword Id	Integer	The keyword id in the *Keywords Table* which is related to the invitation from which the user got to the website. This is usually stored in the redirection within the invitation as a parameter.
Action	Text	A string representing the type of action this request stands for. Can be a click, purchase, registration etc.

FIG. 7G

Field	Value	Description
Id	Integer	An identifying field for the negative keyword
Text	Text	The text of the negative keyword
Language	A language code	
Source	Integer	The identification of the source which directly brought to this negative keyword
ICS Id		The id of the Invitation Cueing Set (I.C.S) for which this page is assigned

FIG. 7H

```
<PAGE url="kenshoo.com/index.asp">Home, Sit Back</PAGE>
<PAGE url=" kenshoo.com/kenshoo_search.asp"> KENSHOO
SEARCH™, Kenshoo Search</PAGE>
<PAGE url=" http://kenshoo.com/services.asp ">Services, Services
</PAGE>
```

FIG. 8

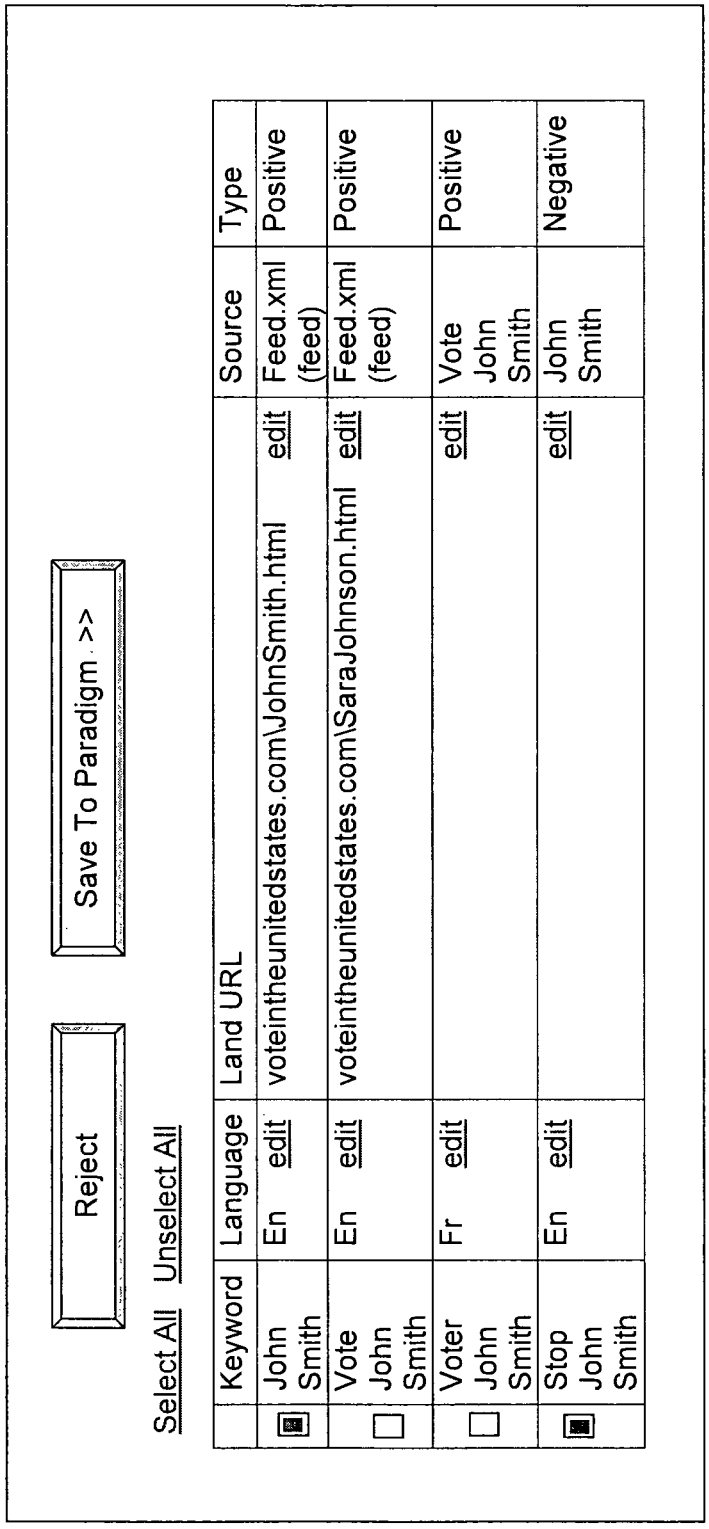

Reject
Save To Paradigm >>
Select All Unselect All
Keyword
Language
Land URL
Source
Type
John Smith
En edit
voteintheunitedstates.com\JohnSmith.html edit
Feed.xml (feed)
Positive
Vote John Smith
En edit
voteintheunitedstates.com\SaraJohnson.html edit
Feed.xml (feed)
Positive
Voter John Smith
Fr edit
edit
Vote John Smith
Positive
Stop John Smith
En edit
edit
John Smith
Negative

FIG. 9

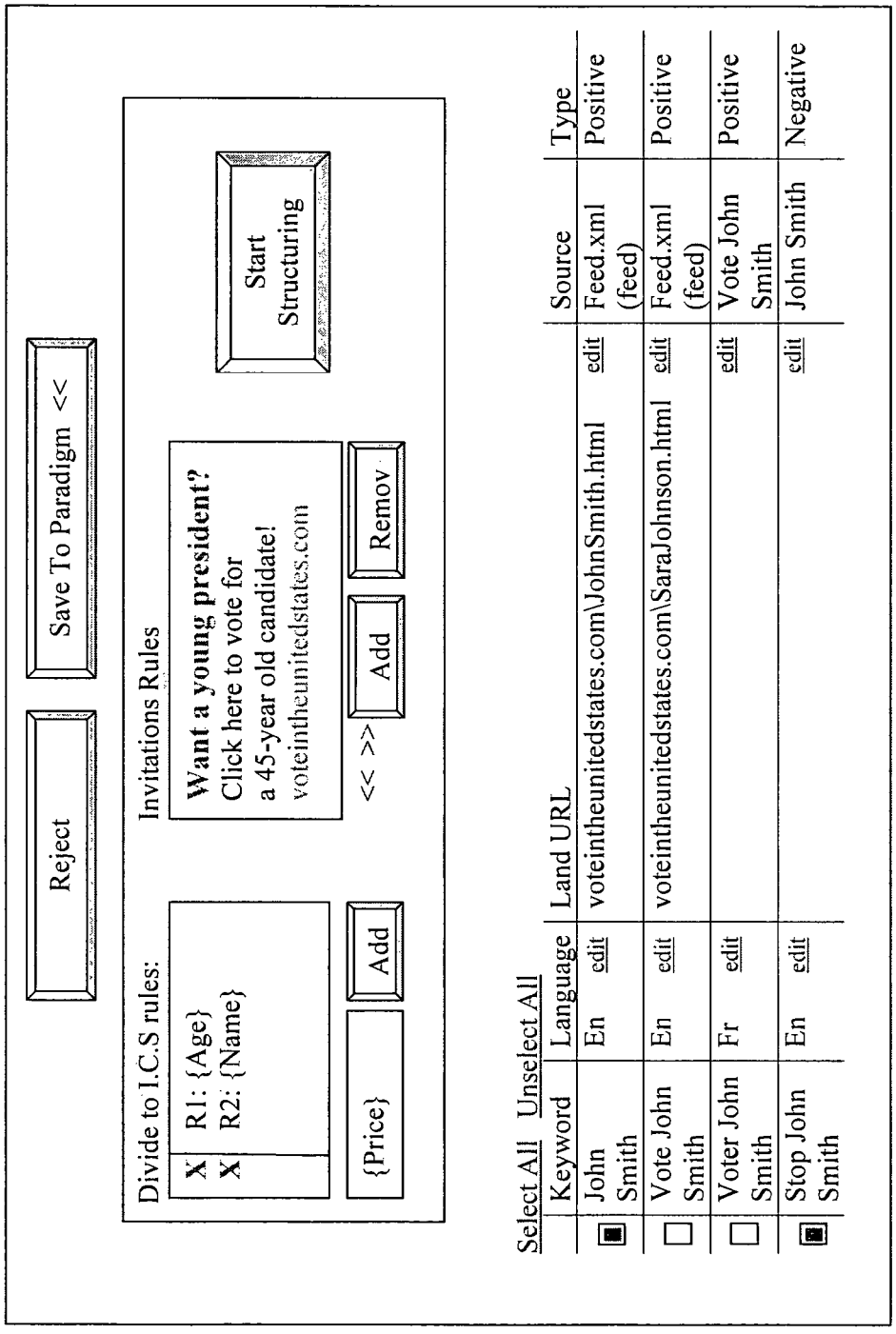

Reject
Save To Paradigm <<
Divide to I.C.S rules:
X R1: {Age}
X R2: {Name}
{Price}
Add
Invitations Rules
Want a young president?
Click here to vote for
a 45-year old candidate!
voteintheunitedstates.com
<< >>
Add
Remov
Start Structuring
Select All Unselect All
Keyword
Language
Land URL
Source
Type
John Smith
En edit
voteintheunitedstates.com\JohnSmith.html edit
Feed.xml (feed)
Positive
Vote John Smith
En edit
voteintheunitedstates.com\SaraJohnson.html edit
Feed.xml (feed)
Positive
Voter John Smith
Fr edit
edit
Vote John Smith
Positive
Stop John Smith
En edit
edit
John Smith
Negative

FIG. 10

Id	Type	Content	Item Id
1	FEED	MySite.xml	Null

FIG. 11A

Id	Type	Content	Item Id
1	FEED	MySite.xml	Null

FIG. 11B

Id	Type	Content	Item Id
1	FEED	MySite.xml	Null
2	KEYWORD	Vote John Smith	1

FIG. 11C

Id	Type	Content	Item Id
1	FEED	MySite.xml	Null
2	KEYWORD	Vote John Smith	1
3	KEYWORD	Democrat candidate	2
4	KEYWORD	Vote Sara Johnson	3
5	KEYWORD	Republican candidate	4

FIG. 11D

Id	Type	Content	Item Id
2	KEYWORD	Vote John Smith	1

FIG. 11E

Id	Type	Content	Item Id
2	KEYWORD	Vote John Smith	1
6	KEYWORD	Voting John	12

FIG. 11F

Id	URL	Language	Source	ICS Id
1	voteintheunitedstates.com\JohnSmith.html	En	1	

FIG. 12A

Id	URL	Language	Source	ICS Id
1	voteintheunitedstates.com\JohnSmith.html	En	1	
2	voteintheunitedstates.com\ SaraJohnson.html	En	1	

FIG. 12B

Id	Content	Language	Page Id	Source	ICS Id
1	Vote John Smith	En	1	1	
2	Democrat candidate	En	1	1	

FIG. 13A

Id	Content	Language	Page Id	Source	ICS Id
1	Vote John Smith	En	1	1	
2	Democrat candidate	En	1	1	
3	Sara Johnson	En	1	1	
4	Republican candidate	En	1	1	

FIG. 13B

Id	Content	Language	Page Id	Source	ICS Id
1	Vote John Smith	En	1	1	
2	Democrat candidate	En	1	1	
3	Vote Sara Johnson	En	2	1	
4	Republican candidate	En	2	1	
5	Governor Smith	En		2	
6	voting Smith	En		2	

FIG. 13C

Id	Content	Language	Page Id	Source	ICS Id
1	Vote John Smith	En	1	1	
2	Democrat candidate	En	1	1	
3	Vote Sara Johnson	En	2	1	
4	Republican candidate	En	2	1	
5	Governor Smith	En		2	
6	voting John Smith	En		2	
7	Voter John Smith	Fr		2	

FIG. 13D

Id	Content	Language	Page Id	Source	ICS Id
1	Vote John Smith	En	1	1	
2	Democrat candidate	En	1	1	
3	Vote Sara Johnson	En	2	1	
4	Republican candidate	En	2	1	
5	Governor Smith	En		2	
6	voting John Smith	En		2	
7	Voter John Smith	Fr		2	
8	Candidat de Democrat	Fr		3	
9	Johnson Security LTD.	En		4	
10	Voter Sara Johnson	Fr		4	
11	Candidat Républicain	Fr		5	

FIG. 13E

Id	Content	Language	Page Id	Source	ICS Id
1	Vote John Smith	En	1	1	1
2	Democrat candidate	En	1	1	
3	Vote Sara Johnson	En	2	1	
4	Republican candidate	En	2	1	
5	Governor Smith	En		2	
6	voting John Smith	En		2	
7	Voter John Smith	Fr		2	
8	Candidat de Democrat	Fr		3	
9	Johnson Security LTD.	En		4	
10	Voter Sara Johnson	Fr		4	
11	Candidat Républicain	Fr		5	

FIG. 13F

Id	Content	Language	Page Id	Source	ICS Id
1	Vote John Smith	En	1	1	1
2	Democrat candidate	En	1	1	1
3	Vote Sara Johnson	En	2	1	2
4	Republican candidate	En	2	1	2
5	Governor Smith	En		2	1
6	voting John Smith	En		2	1
7	Voter John Smith	Fr		2	1
8	Candidat de Democrat	Fr		3	1
9	Johnson Security LTD.	En		4	2
10	Voter Sara Johnson	Fr		4	2
11	Candidat Républicain	Fr		5	2

FIG. 13G

Id	Content	Language	Page Id	Source	ICS Id
12	Voting John	En		1	

FIG. 13H

Id	Content	Language	Page Id	Source	ICS Id
12	Voting John	En		2	
13	Voting John John	En		6	
14	Voter pour John	Fr		6	

FIG. 13I

Id	Content	Language	Page Id	Source	ICS Id
12	Voting John	En		2	1
13	Voting John John	En		6	1
14	Voter pour John	Fr		6	1

FIG. 13J

Page	Name	Value	Type
1	LandUrl	voteintheunitedstates.com\JohnSmith.html	String
1	Age	45	String
1	Name	John Smith	String
1	Gender	Male	Float
1	Party	Democrat	Float

FIG. 14A

Page	Name	Value	Type
1	LandUrl	voteintheunitedstates.com\JohnSmith.html	String
1	Age	45	String
1	Name	John Smith	String
1	Gender	Male	Float
1	Party	Democrat	Float
2	LandUrl	voteintheunitedstates.com\ SaraJohnson.html	String
2	Age	43	String
2	Name	Sara Johnson	String
2	Gender	Female	Float
2	Party	Republican	Float

FIG. 14B

Id	Name	Target
1	John Smith	

FIG. 15A

Id	Name	Target
1	John Smith	
2	Sara Johnson	

FIG. 15B

Id	Data*	Redirection	ICS Id
1	Header: Vote For John Smith Line 1: Participate in the US Elections! Line 2: Vote for the democrat candidate! Display URL: Voteintheunitedstates.com	voteintheunitedstates.com\ JohnSmith.html	1

FIG. 16A

Id	Data	Redirection	ICS Id
1	Header: Vote For John Smith Line 1: Participate in the US Elections! Line 2: Vote for the democrat candidate! Display URL: Voteintheunitedstates.com	voteintheunitedstates.com\ JohnSmith.html	1
2	Header: Vote For Sara Johnson Line 1: Participate in the US Elections! Line 2: Vote for the republican candidate! Display URL: Voteintheunitedstates.com	voteintheunitedstates.com\ SaraJohnson.html	2

FIG. 16B

Id	Date	Cookie		Key-word Id	Action
1	2/5/2008	8FGJ	fakese.com/?q=Voting+John	1	Click
2	2/5/2008	8FGJ	voteintheunitedstates.com\JohnSmith.html	1	Register
3	3/5/2008	J77Y	fakese.com/?q= Stop+Vote+John+Smith	1	Click
4	4/5/2008	J77Y	fakese.com/?q= Stop+Vote+John+Smith	1	Click
5	5/5/2008	KRT7	fakese.com/?q=Stop+Vote+John+Smith	1	Click
6	6/5/2008	9IKL	fakese.com/?q=Republican+Party	5	Click
7	7/5/2008	9IKL	voteintheunitedstates.com\ SaraJohnson.html	5	Vote

FIG. 17

Id	Content	Language	Page Id	Source	ICS Id
1	Stop	En		2	

FIG. 18A

Id	Content	Language	Page Id	Source	ICS Id
1	Stop	En		2	1

FIG. 18B

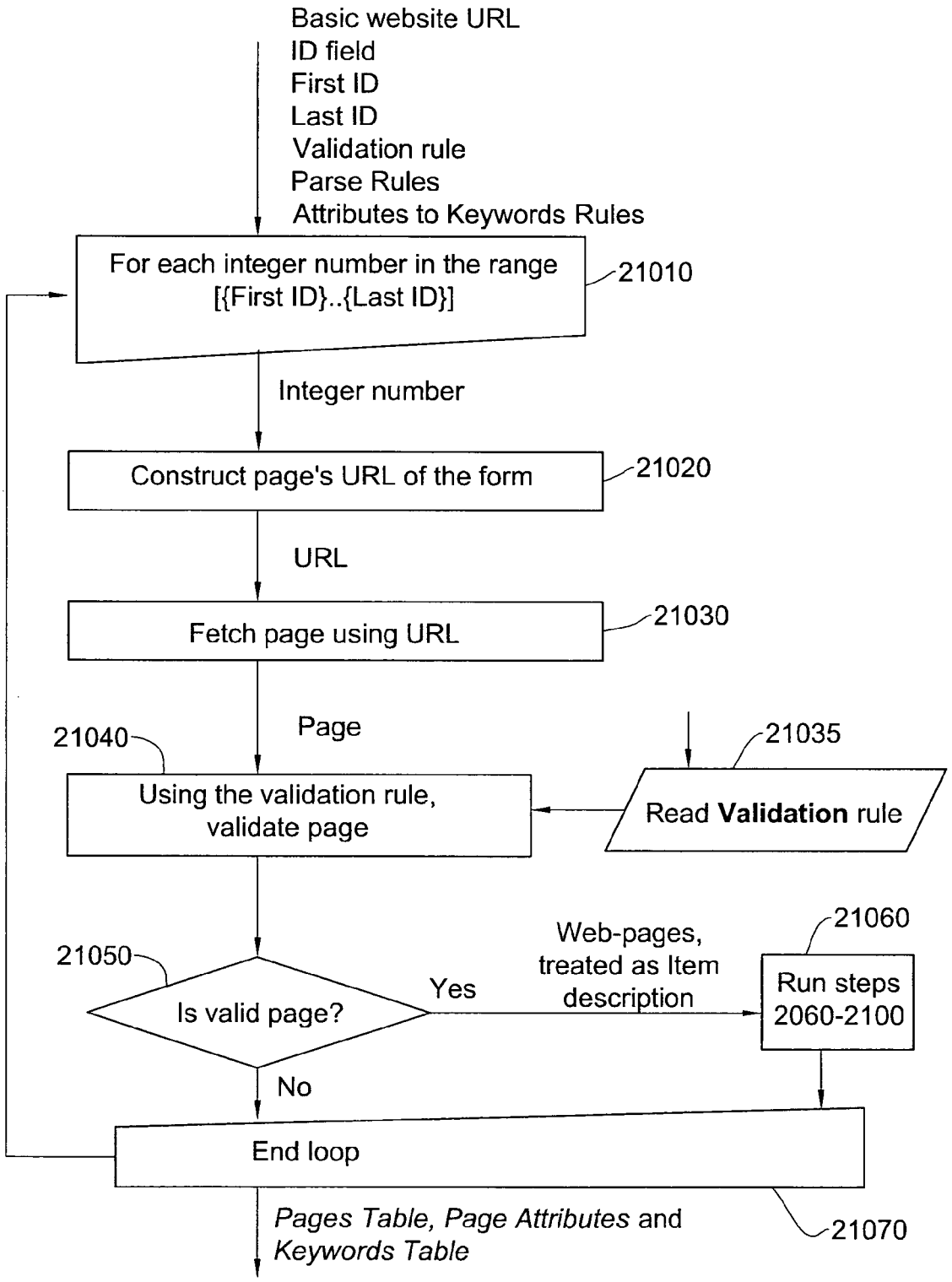

Basic website URL
ID field
First ID
Last ID
Validation rule
Parse Rules
Attributes to Keywords Rules
For each integer number in the range [{First ID}..{Last ID}]
21010
Integer number
Construct page's URL of the form
21020
URL
Fetch page using URL
21030
Page
21040
Using the validation rule, validate page
21035
Read Validation rule
21050
Is valid page?
Yes
Web-pages, treated as Item description
21060
Run steps 2060-2100
No
End loop
Pages Table, Page Attributes and Keywords Table
21070

FIG. 19

SYSTEM FOR FINDING WEBSITE INVITATION CUEING KEYWORDS AND FOR ATTRIBUTE-BASED GENERATION OF INVITATION-CUEING INSTRUCTIONS

REFERENCE TO CO-PENDING APPLICATIONS

The present application is a continuation of International Patent Application No. PCT/IL2008/000709 filed on May 26, 2008, published Dec. 3, 2009 as Publication No. WO/2009/144698, the disclosure of which is incorporated herein by reference in its entirety.

Reference is made to co-pending U.S. patent application Ser. No. 12/031,352, entitled "Computer implemented system and method for enhancing keyword expansion" and filed 14 Feb. 2008, issued Jul. 5, 2011 as U.S. Pat. No. 7,974,989, claiming priority from U.S. Ser. No. 60/902,055 filed 20 Feb. 2007.

FIELD OF THE INVENTION

The present invention relates generally to websites and more particularly to systems displaying, to users of an information network, invitations to visit certain websites.

BACKGROUND OF THE INVENTION

Google Adwords enables website owners to advertise their websites on Google for a fee payable each time an Internet user clicks the advertisement. The website owner selects one or more keywords, which are words or phrases related to his/her website. When Internet users search on the Google search engine using one of the selected keywords, the website owner's advertisement may be displayed next to the search results. Google's Keyword Tool prompts website owners to enter words or phrases descriptive of their website, or to input the website's URL, and generates suggested keywords as a function of this input.

The disclosures of any publications and patent documents mentioned in the specification, and of any publications and patent documents cited therein directly or indirectly, are hereby incorporated by reference.

SUMMARY OF THE INVENTION

Certain embodiments of the present invention seek to provide a system for finding website invitation cueing keywords, based on user acquiescence information.

Certain embodiments of the present invention seek to provide a system for template generation of invitations to websites.

Certain embodiments of the present invention seek to provide a system for attribute-based generation of invitation-cueing sets.

There is thus provided, in accordance with at least one embodiment of the present invention, a system for identifying negative keywords, the system comprising a non-acquiescence information collector operative to collect information indicating, for each individual website from among a multiplicity of websites, at least one keyword which brought at least one user into contact with the individual website but did not result in a defined criterion for acquiescence of a user to at least one suggestion presented by the website; and a negative keyword definer operative to define at least one specific keyword which brought at least one user into contact with a specific website but did not result in a transaction between the user and the website, as a negative keyword for the specific website.

Also provided, in accordance with another embodiment of the present invention, is a method for identifying negative keywords, the method comprising collecting information indicating, for each individual website from among a multiplicity of websites, at least one keyword which brought at least one user into contact with the individual website but did not result in a defined criterion for acquiescence of a user to at least one suggestion presented by the website; and defining at least one specific keyword which brought at least one user into contact with a specific website but did not result in a transaction between the user and the website, as a negative keyword for the specific website.

Also provided, in accordance with another embodiment of the present invention, is a method for template generation of an invitation, the method comprising receiving digital input and deriving a set of keywords therefrom, defining a set of attributes for each keyword in the set by assigning an attribute value to each attribute in the set of attributes, for each keyword in the set of keywords, providing at least one invitation format including an arrangement of at least some of the attributes in the set of attributes; and generating at least one invitation having the format including, for at least one keyword in the set of keywords, arranging the keyword's attribute values in accordance with the arrangement.

Further provided, in accordance with another embodiment of the present invention, is a method for generating invitation cueing sets from a digital representation of a website comprising receiving digital input and deriving a set of keywords therefrom, defining a set of attributes for each keyword in the set by assigning an attribute value to each attribute in the set of attributes, for each keyword in the set of keywords, providing an invitation cueing keyword set generating criterion defined over the sets of attributes, and generating sets of invitation cueing keywords, each set comprising a subset of the set of keywords, using the criterion.

Also provided, in accordance with another embodiment of the present invention, is a method for improving utilization, by an individual website, of a system displaying invitations inviting users to visit websites, the invitations being displayed responsive to keywords associated with users, the method comprising extracting, from a website log recording interactions by a population of users with the individual website, at least one character string characterizing a user's session with the individual website, an associated invitation issued to the user responsive to an association of the user to the character string detected by the system; an associated ID of the user and an associated indication of interactions between the user and the website, defining at least one character string eligibility condition over the interactions associated with an individual character string, indicating that an individual character string is eligible to be defined as a keyword, checking character strings extracted from the website log to identify character strings conforming with at least one the eligibility condition, and designating to an invitation displaying system at least an individual one of the conforming character strings as a keyword responsive to which the invitation associated, in the website log, with which the individual conforming character string is to be issued.

Additionally provided, in accordance with another embodiment of the present invention, is an invitation display auxiliary apparatus for improving utilization, by an individual website, of a system displaying invitations inviting users to visit websites, the invitations being displayed responsive to keywords associated with users, the apparatus com-

prising a log-based user session definer operative to extract, from a website log recording interactions by a population of users with the individual website, at least one character string characterizing a user's session with the individual website, an associated invitation issued to the user responsive to an association of the user to the character string detected by the system; an associated ID of the user and an associated indication of interactions between the user and the website, a character string eligibility condition generator operative to define at least one character string eligibility condition over the interactions associated with an individual character string, indicating that an individual character string is eligible to be defined as a keyword, a string finder operative to check character strings extracted from the website log to identify character strings conforming with at least one eligibility condition, and an invitation display system interface operative to designate to an invitation displaying system at least an individual one of the conforming character strings as a keyword responsive to which the invitation associated, in the website log, with which the individual conforming character string is to be issued.

Additionally provided, in accordance with another embodiment of the present invention, is a system for generating invitation cueing sets from a digital representation of a website comprising apparatus for receiving digital input and deriving a set of keywords therefrom, a keyword attribute characterizer defining a set of attributes for each keyword in the set by assigning an attribute value to each attribute in the set of attributes, for each keyword in the set of keywords, an invitation cueing keyword set generator operative to generate sets of invitation cueing keywords, each set comprising a subset of the set of keywords, using an invitation cueing keyword set generating criterion defined over the sets of attributes.

Further provided, in accordance with another embodiment of the present invention, is an invitation template generation system comprising a keyword set generator operative to receive digital input and derive a set of keywords therefrom, a keyword characterizer operative to define a set of attributes for each keyword in the set by assigning an attribute value to each attribute in the set of attributes, for each keyword in the set of keywords, an invitation format generator providing at least one invitation format including an arrangement of at least some of the attributes in the set of attributes; and an invitation assembler operative to generate at least one invitation having the format including, for at least one keyword in the set of keywords, assembling the keyword's attribute values in accordance with the arrangement.

Further provided, in accordance with another embodiment of the present invention, is a method for improving utilization, by an individual website, of a system displaying invitations inviting users to visit websites, the invitations being displayed responsive to keywords associated with users, the method comprising extracting, from a website log recording interactions by a population of users with the individual website, at least one character string characterizing a user's session with the individual website, an associated invitation issued to the user responsive to an association of the user to the character string detected by the system; an associated ID of the user and an associated indication of any interactions between the user and the website, defining at least one character string eligibility condition on the interactions associated with an individual character string, indicating that an individual character string is eligible to be defined as a negative keyword, checking character strings extracted from the website log to identify character strings conforming with at least one the eligibility condition, and designating to an invitation displaying system at least an individual one of the conforming character strings as a negative keyword responsive to which the invitation associated, in the website log, with the individual conforming character string is not to be issued.

Also provided, in accordance with another embodiment of the present invention, is an invitation display auxiliary apparatus for improving utilization, by an individual website, of a system displaying invitations inviting users to visit websites, the invitations being displayed responsive to keywords associated with users, the apparatus comprising a log-based user session definer operative to extract, from a website log recording interactions by a population of users with the individual website, at least one character string characterizing a user's session with the individual website, an associated invitation issued to the user responsive to an association of the user to the character string detected by the system; an associated ID of the user and an associated indication of interactions between the user and the website, a character string eligibility condition generator operative to define at least one character string eligibility condition over the interactions associated with an individual character string, indicating that an individual character string is eligible to be defined as a keyword, a string finder operative to check character strings extracted from the website log to identify character strings conforming with at least one the eligibility condition; and an invitation display system interface operative to designate to an invitation displaying system at least an individual one of the conforming character strings as a negative keyword responsive to which the invitation associated, in the website log, with the individual conforming character string is not to be issued.

Certain embodiments of the present invention are useful in applications in which it is desired to find search terms which have yielded clicks but no conversions, define them as negative keywords and put them in a relevant invitation cueing set, e.g. adgroup, e.g. according to fields of a request.

Certain embodiments of the present invention are useful in applications in which it is desired to extract pages with keywords and attributes using crawlers, and then automatically generate creatives using predefined rules.

Certain embodiments of the present invention are useful in keyword harvesting applications in which it is desired to extract a search term from website (proxy) logs and to select good search teal's, using a suitable goodness criterion such as conversion, for addition to existing invitation cueing sets.

Certain embodiments of the present invention are useful in keyword harvesting applications in which an invitation display system such as a search engine with invitation display capabilities, more highly rates or positions bidded keywords that are the same as the search term, relative to bidded keywords that are more general than the search term.

Any suitable processor, display and input means may be used to process, display, store and accept information, including computer programs, in accordance with some or all of the teachings of the present invention, such as but not limited to a conventional personal computer processor, workstation or other programmable device or computer or electronic computing device, either general-purpose or specifically constructed, for processing; a display screen and/or printer and/or speaker for displaying; machine-readable memory such as optical disks, CDROMs, magnetic-optical discs or other discs; RAMs, ROMs, EPROMs, EEPROMs, magnetic or optical or other cards, for storing, and keyboard or mouse for accepting. The term "process" as used above is intended to include any type of computation or manipulation or transfor-

mation of data represented as physical, e.g. electronic, phenomena which may occur or reside e.g. within registers and/or memories of a computer.

The above devices may communicate via any conventional wired or wireless digital communication means, e.g. via a wired or cellular telephone network or a computer network such as the Internet.

The apparatus of the present invention may include, according to certain embodiments of the invention, machine readable memory containing or otherwise storing a program of instructions which, when executed by the machine, implements some or all of the apparatus, methods, features and functionalities of the invention shown and described herein. Alternatively or in addition, the apparatus of the present invention may include, according to certain embodiments of the invention, a program as above which may be written in any conventional programming language, and optionally a machine for executing the program such as but not limited to a general purpose computer which may optionally be configured or activated in accordance with the teachings of the present invention.

The embodiments referred to above, and other embodiments, are described in detail in the next section.

Any trademark occurring in the text or drawings is the property of its owner and occurs herein merely to explain or illustrate one example of how an embodiment of the invention may be implemented.

Unless specifically stated otherwise, as apparent from the following discussions, it is appreciated that throughout the specification discussions, utilizing terms such as, "processing", "computing", "estimating", "selecting", "ranking", "grading", "calculating", "determining", "generating", "reassessing", "classifying", "generating", "producing", "stereo-matching", "registering", "detecting", "associating", "superimposing", "obtaining" or the like, refer to the action and/or processes of a computer or computing system, or processor or similar electronic computing device, that manipulate and/or transform data represented as physical, such as electronic, quantities within the computing system's registers and/or memories, into other data similarly represented as physical quantities within the computing system's memories, registers or other such information storage, transmission or display devices.

The following terms may be construed either in accordance with any definition thereof appearing in the prior art literature or in accordance with the specification, or as follows:

Paradigm—A set of invitation Cueing Sets. A campaign which uses a website, such as a website promoting participation in elections, to promote a behavioral goal, such as voting behavior, is an example of a paradigm. The goal may be acquiescence with a behavior proposed by the website such as filling in a voter registration form required for overseas voters.

Expansion tool—A computer based method used to generate a set of keywords given a keyword or a set of positive keywords. There is usually some kind of relation between the input and output, for example, Google's keyword tool.

Feed—Synonym for "website representation".

Invitation—a display of user-sensible content pertaining to a website, the display being associated with the address of the website. An invitation is typically displayed by an invitation displaying system to individual users responsive to invitation cueing keywords found by the system to be associated with the individual users.

Invitation cueing instruction set (also invitation cueing set, ICS)—A set of instructions for an invitation displaying system. The set of instructions typically comprises at least an invitation set, including one or more invitations, and a (positive) keyword set, including invitation cueing keywords. When the (positive) keyword set is provided to an invitation displaying system, the invitation displaying system is operative to display one of the invitations in the invitation set, according to pre-defined invitation selection rules, if there are more than one invitations in the invitation set) to individual users found by the system to be associated with any of the invitation cueing keywords in the (positive) keyword set. An invitation cueing instruction set may include other components, such as a set of negative keywords. An adgroup is an example of an invitation cueing set.

An example of an Invitation Cueing Set is as follows:

Positive keywords=(
- "elections"
- "voting"
- "republican candidate"

);
invitations=(
- Join the elections
  Click here to register
  quick and free
  voteintheunitedstates.com
- Support the Republican Candidate?
  Click here to
  register and influence
  voteintheunitedstates.com

)
Negative Keywords = (
- Senate
- Congress

)

Item Description—A textual segment, possibly with formatting, which gives information about an item and its features. For example, "<PAGE>voteintheunitedstates.com/JohnSmith.html; 45, John Smith </Page>".

Keyword—a set of words and symbols. For example, "John", "Apollo 13", "Q&A".

Land URL—The address or location for which an invitation invites. For example, "voteintheunitedstates.com/JohnSmith.html", "phone no. +972-(70)-07070707",

Metadata—Any information which refers to some item. For instance, Keyword's metadata can be its source, number of words, type (negative, positive), performance metrics etc.

Negative keyword—a keyword which is defined by an owner of an individual website and which, if associated by an invitation display system with a certain user, would cue the invitation display system such as a search engine, to refrain from displaying an invitation to the individual website to that user. Usually, negative keywords override positive keywords associated with the same user in that a user associated with a positive keyword and a negative keyword defined for the same website, is typically not exposed, by the invitation display system, to an invitation to that website.

Page—webpage.

Page Attribute (or just Attribute)—A feature of a page or of items described within the page. For example, in a page containing a candidate for presidency with his name, age, height and political view, each of the above can be an attribute.

Performance Metric—A quantitative measure which is associated with an element (such as but not limited to a keyword or invitation) in a Paradigm, and which quantifies performance of the element. For example, performance metrics of a keyword may include the number of times it was used to search and/or the number or percentage of users who after using the keyword for searching clicked on the website own-

er's invitation. Performance metrics of an invitation may for example include the number of times it was viewed and/or the number of clicks it earned and/or the number of users who, after clicking on it, registered.

Positive/Negative Condition—In this invention: a Boolean expression used to select a subset of items from a set of items using their metadata.

Positive Keyword—a keyword which is defined by an owner of an individual website and which, if associated by an invitation display system with a certain user, would (typically, unless overridden by a negative keyword associated with the same user) cue the invitation display system such as a search engine, to display an invitation to the individual website to that user.

Possible actions—a set of textual strings that an action (or equivalent) field may contain. For example, clicks, registration, purchase, voting or other forms of acquiescence with a website proposed alternative.

Rules—a set of instructions in a predefined format which instruct a process how to take specific decisions.

Search phrase—A keyword which is given to a search engine in order to find relevant items. For example, "elections".

Source—An element (positive keyword, page, feed etc.) which by applying some action or a set of actions on or related to it yielded another element, will be called the source of the latter. Given a multiplicity of sources, which is the direct source or simply the source can be understood from the context. Moreover an element may have multiple sources. For example, using the Expand Keyword process on the keyword "voting" the result may be "Ukraine elections" and "US voting", so the source of both will be "voting".

User—A person or computer based entity that uses an information network and is invited to visit various websites.

Website Owner—A person or computer based entity that manages the performance of an individual website including issuing invitations to users to visit the individual website, typically via an invitation displaying system.

Website Representation—An object, physical or virtual, which contains detailed information on a website or certain parts of it. For example, as per the example of FIG. **8** which is a partial representation of a kenshoo.com website. Format is a list of <PAGE> tags, with an attribute named url (which contains the page address), the title of the link to the page on the main page, a comma, and the headline of the page.

Keyword—string of letters and numbers which may or may not be subdivided into words, such as "Vote Johnson".

Website log—(a) a log of traffic arriving at an individual website and interacting therewith, including a record of the requests to the website and responses provided by the website. Some requests include search terms. For example, certain requests includes a referrer field indicating the referring entity (typically the URL of a referring website such as a search engine including the search term, which when used by the requester, resulted in the requester being invited to click on the URL of the individual website inter alia), or (b) A set of records describing transactions (requests and responses) that have passed through the website.

Acquiescence—a user's acceptance of at least one suggestion presented by a website including providing at least one website-requested input other than a website navigating input. For example, if a user fills out a voter registration form presented by and appearing within a website, this is may be defined by a system as an instance or form of acquiescence. Joining a distribution list promoted within a website may be defined by a system as an instance or form of acquiescence. Signing a petition presented within a website may be defined by a system as an instance or form of acquiescence. Making a donation responsive to a cause presented by a website may be defined by a system as an instance or form of acquiescence.

BRIEF DESCRIPTION OF THE DRAWINGS

Certain embodiments of the present invention are illustrated in the following drawings:

FIG. **1** is a simplified functional block diagram illustration of a system for positive and/or negative Keyword Acquisition and Paradigm generation, the system being constructed and operative in accordance with certain embodiments of the present invention;

FIG. **2** is a simplified flowchart illustration of a method for Keyword Extraction from a Website Representation, the method being constructed and operative in accordance with certain embodiments of the present invention. The method of FIG. **2** is suitable for implementing the operation of functional unit **1010** of FIG. **1**, according to a first embodiment of the present invention in which keywords are extracted from a digital representation of a website which may or may not include the website itself;

FIG. **3**A is a simplified flowchart illustration of a method for Keyword Extraction from Website Logs, the method being constructed and operative in accordance with certain embodiments of the present invention. The method of FIG. **3**A is suitable for implementing the operation of functional unit **1010** of FIG. **1**, according to a second embodiment of the present invention in which keywords are extracted from a website log;

FIG. **3**B is a simplified flowchart illustration of a method for performing the per-search phrase metric aggregation loop of FIG. **3**A, the method being constructed and operative in accordance with certain embodiments of the present invention;

FIG. **4** is a simplified flowchart illustration of a method for Keyword Expansion, the method being constructed and operative in accordance with certain embodiments of the present invention. The method of FIG. **4** is suitable for implementing the operation of functional unit **1020** of FIG. **1**;

FIG. **5**A is a simplified flowchart illustration of a method for Paradigm Structuring—given a list of positive keywords, the method being constructed and operative in accordance with certain embodiments of the present invention. The method of FIG. **5**A is suitable for implementing the operation of functional unit **1040** of FIG. **1**, according to a first embodiment of the present invention in which a paradigm is structured in accordance with a list of keywords;

FIG. **5**B is a simplified flowchart illustration of a method for performing the "divide keywords into invitation cueing sets" loop of FIG. **5**A, the method being constructed and operative in accordance with certain embodiments of the present invention;

FIG. **6** is a simplified flowchart illustration of a method for Paradigm Structuring given a list of negative keywords, the method being constructed and operative in accordance with certain embodiments of the present invention. The method of FIG. **6** is suitable for implementing the operation of functional unit **1040** of FIG. **1**, according to a second embodiment of the present invention in which a Paradigm is structured with a list of negative keywords;

FIGS. **7**A-**7**H are data tables which may be used by the system of FIG. **1** in accordance with certain embodiments of the present invention;

FIG. **8** is an example of a website representation which may be used as input by the system of FIG. **1** in accordance with certain embodiments of the present invention;

FIG. **9** is a simplified pictorial illustration of a first website owner validation display screen which may be presented by the optional website owner validation functional unit of the system of FIG. **1**;

FIG. **10** is a simplified pictorial illustration of a second website owner display screen which may be presented by the optional website owner validation functional unit of the system of FIG. **1**;

FIGS. **11**A-**11**F describe various example states of the source table of FIG. **7**D, which may occur in example uses of the system of FIG. **1**;

FIGS. **12**A-**12**B describe example states of the page table of FIG. **7**A, which may occur in example uses of the system of FIG. **1**;

FIGS. **13**A-**13**J describe various example states of the positive keyword table of FIG. **7**B, which may occur in example uses of the system of FIG. **1**;

FIGS. **14**A-**14**B describe example states of the page attribute table of FIG. **7**C, which may occur in example uses of the system of FIG. **1**;

FIGS. **15**A-**15**B describe various example states of the Invitation cueing set table of FIG. **7**F, which may occur in example uses of the system of FIG. **1**;

FIGS. **16**A-**16**B describe various example states of the Invitation table of FIG. **7**E, which may occur in example uses of the system of FIG. **1**;

FIG. **17** describes an example state of the Website Log table of FIG. **7**G, which may occur in example uses of the system of FIG. **1**;

FIGS. **18**A-**18**B describe various example states of the Negative keywords table of FIG. **7**H, which may occur in example uses of the system of FIG. **1**; and

FIG. **19** is a simplified flowchart illustration of a method for numerical crawling which is constructed and operative in accordance with certain embodiments of the present invention.

DETAILED DESCRIPTION OF CERTAIN EMBODIMENTS

FIG. **1** is a simplified functional block diagram illustration of a system for positive and/or negative Keyword Acquisition and Paradigm generation, the system being constructed and operative in accordance with certain embodiments of the present invention. The output of keyword extraction unit **1010** may be stored in the page, positive keyword, page attribute and source tables of FIGS. **7**A-**7**D respectively as described in detail below. The output of keyword expansion unit **1020** may also be stored in the page, positive keyword, page attribute and source tables of FIGS. **7**A-**7**D respectively as described in detail below. The output of the Paradigm structuring unit **1040** may be stored in the positive keyword, invitations and invitation cueing set tables of FIGS. **7**B, **7**E and **7**F respectively, as described in detail below.

FIG. **2** is a simplified flowchart illustration of a method of operation for the Keyword Extraction unit **1010** of FIG. **1**, the method being constructed and operative in accordance with certain embodiments of the present invention in which the input to the unit **1010** comprises a Website Representation. The method of FIG. **2** typically comprises some or all of the illustrated generally self-explanatory steps, suitably ordered e.g. as illustrated.

Regarding steps **2020**-**2070**, various formats of website representations may be used and the rules used by the Extract Keywords process may be different than those specifically illustrated. For instance, a keyword extraction system may be designed which can extract keywords from a given known format, such as an RSS, which has a well defined structure having no degrees of freedom. In this case, no rules need be provided by a website owner who provides the RSS to the system.

An item description validation step may be added, e.g. immediately after step **2050**. In this step, the system can check that each item description is valid, typically in the sense that when processed in subsequent steps, it will produce sensible results. An example for such validation is to provide a Java Regular Expression as a validation rule. An item description is then valid if the expression is found in the item description, and invalid otherwise. This validation is beneficial when the item descriptions are actual web-pages.

FIG. **3**A is a simplified flowchart illustration of a method of operation for the Keyword Extraction unit **1010** of FIG. **1**, the method being constructed and operative in accordance with certain embodiments of the present invention in which the input to the unit **1010** comprises a Website Log. The method of FIG. **3**A typically comprises some or all of the illustrated generally self-explanatory steps, suitably ordered e.g. as illustrated. In Step **2140**, the source ID may, for instance, appear as a parameter in a redirecting URL which exists in an invitation generated by a SEM system. The user tracking ID may appear as an HTTP cookie. The search phrase may for example be derived from the referrer field of the HTTP request, which is the URL of the page the user came from. This URL often includes a standard parameter whose value is the search term. For instance, the fields may be:

GET voteintheunitedstates.com/JohnSmith.html?keyword_id=1&invitation id=1
Cookie: YTGHIKLJHNBVMNBY
Referrer: fakese.com/search?q=Voting+John+Smith.

FIG. **3**B is a simplified flowchart illustration of a method for performing the per-search phrase metric aggregation step **2130** of FIG. **3**A, the method being constructed and operative in accordance with certain embodiments of the present invention. The method of FIG. **3**B typically comprises some or all of the illustrated generally self-explanatory steps, suitably ordered e.g. as illustrated.

FIG. **4** is a simplified flowchart illustration of a method of operation for the Keyword Expansion unit **1020** of FIG. **1**, the method being constructed and operative in accordance with certain embodiments of the present invention. The method of FIG. **4** typically comprises some or all of the illustrated generally self-explanatory steps, suitably ordered e.g. as illustrated. In Step **3050**, each expansion rule typically may either point to a proprietary keyword expansion tool or include a form of redirection to a conventional keyword expansion tool such as but not limited to Google's keyword tool, Wordtracker and Seo Book Keyword Suggestion Tool.

FIG. **5**A is a simplified flowchart illustration of a method of operation for the Paradigm Structuring unit **1040** of FIG. **1**, given a list of positive keywords, the method being constructed and operative in accordance with certain embodiments of the present invention. The method of FIG. **5**A typically comprises some or all of the illustrated generally self-explanatory steps, suitably ordered e.g. as illustrated. Regarding Steps **4050** and **4120**, the rules typically instruct how to obtain attributes per positive keyword, using fields included in the keyword's record in the Positive Keyword Table of FIG. **7**B, such as the Page ID field Source field, Invitation Cueing Set ID, etc. The rules may instruct how to use these IDs as references to other tables such as the Page Attribute Table of FIG. **7**C, in order to obtain respective information stored there, such as page attributes.

FIG. **5**B is a simplified flowchart illustration of a method for performing the "divide keywords into invitation cueing

sets" step **4030** of FIG. **5**A, the method being constructed and operative in accordance with certain embodiments of the present invention. The method of FIG. **5**B typically comprises some or all of the illustrated generally self-explanatory steps, suitably ordered e.g. as illustrated.

FIG. **6** is a simplified flowchart illustration of a method for Paradigm Structuring—given a list of negative keywords, the method being constructed and operative in accordance with certain embodiments of the present invention. The method of FIG. **6** typically comprises some or all of the illustrated generally self-explanatory steps, suitably ordered e.g. as illustrated.

Additional parameters may be set in the process of paradigm structuring, depending on the specific invitation displaying system. For instance, in several such systems it is possible to set Geo-Targeting to Paradigms and to Invitation Cueing Instruction Sets, thereby to address an invitation only to certain users such as users from a specified region or only those users who use a specified language. The language field in the Positive Keywords can be used to ensure that keywords in French do not become part of Invitation Cueing Instruction Sets which are displayed in English-speaking countries and vice versa.

In Steps **2020**, **2115**, **3010**, **4010** and the like, prompting of the website owner can be replaced by initially storing the relevant information in a suitable data structure, and retrieving therefrom as the relevant information is used.

An example of a suitable Data Structure for the system of FIG. **1** includes the tables of FIGS. **7**A-**7**H. Page Data may be stored in the PagesTable of FIG. **7**A. The language field can be extracted automatically by standard packages, given as a parameter in various ways or left for the website owner to manually configure, with some arbitrary default. In specific examples below the default was chosen to be "En" (code for English). Positive keywords may be stored in the Positive Keywords Table of FIG. **7**B.

Page Attributes may be stored in the Page Attributes Table of FIG. **7**C. If all of the attributes are instances of a small number of abstract attributes, then the name and the type fields can be stored in a separate table, called Abstract Attributes, together with an identifying field, so that in Page Attribute Table the name and type will be replaced with the identifying field from AbstractAttributes.

Sources may be stored in the Sources Table of FIG. **7**D. Invitations may be stored in the invitations table of FIG. **7**E. Invitation Cueing Sets may be stored in the Invitation Cueing Set Table of FIG. **7**F. Website Log data may be stored in the website log Table of FIG. **7**G. Many other fields may exist in the website log table other than those shown. Negative Keywords may be stored in the Negative Keywords Table of FIG. **7**H.

Suitable rules, such as some or all of the following rules, may be provided by a website owner and suitably stored:

a. Attributes to Keywords rule—Instruct the Extract Keywords process (step **1010** in FIG. **1**) how to create keywords according to page attributes. For example, given the attributes Name="John Smith", PoliticalView="democrat" a rule can be

R:The {PoliticalView} {Name}

So the resulting keyword will be "The democrat John Smith"

b. Divide to Invitation Cueing Set rule—Instruct the Structure Paradigm process how to divide the keywords to Invitation Cueing Set according to their metadata. For example, the rule can be

R:Keyword.Source

Each keyword will be inserted to an Invitation Cueing Set whose name is the same as the keyword's source.

c. Expansion rule—Instruct to the expansion process how to find for each keyword/set of keywords a set of related keywords. The simplest form is a list of expansion tools.

d. Invitation rule—Instructs the Structure Paradigm process how to construct an invitation using the positive keywords of the Invitation Cueing Set and related metadata. For example, given the page attribute related to a certain Invitation Cueing Set—MaritalStatus="Single", Age=45—the rule can be

R: Header="Want a {MaritalStatus} President?" Line1="Click here to vote for" Line2="a {Age} years old candidate!" LandURL="voteintheunitedstates.com"

So the resulting invitation will be

Want a Single President?

Click here to vote for

a 45 year old candidate!

voteintheunitedstates.com

e. Parse rule—Instructs the Extract Keyword process how to extract attributes from item descriptions in the website representation. For example,

R:<PAGE>{Land URL}; {Age},{Name}</Page>

Using it on the item description

<PAGE>voteintheunitedstates.com/JohnSmith.html; 45, John Smith <Page> yields the attributes

Land URL=voteintheunitedstates.com

Age=45

Name=John Smith

f. Split rule—Instructs the Extract Keyword process how to split the web representation into item descriptions. For example, the rule, written as a Java Regex, can be

R: .*;

Using it on the website representation

John Smith, 45; Israel Israeli, 77;

yields

John Smith, 45

Israel Israeli, 77

Additional Data structures, other than the tables and rules described, may include some or all of the following:

a. Website Representation which may, for example, be stored in a string

b. List of item descriptions which may for example be stored in a linked list of strings

c. Item description which may for example be stored in a string

d. A (Land URL, List of attributes) pair which may for example be stored in two variables (String and String), a list of strings or a specially devised data structure

e. A (Land URL, list of attributes, list of keywords) triplet which may for example be stored in three variables (String, String and List of Strings), a list of objects or a specially devised data structure

f. Website Logs entries with search phrases (same as the full table only in memory) which may for example can be stored in a table like data-structure (list of records)

g. A (Search phrase, user id, source) triplet which may for example be stored in three variables (String, String and Integer), a list of objects or a specially devised data structure

h. A (Search phrase, user id, source, a list of log entries) set which may for example be stored in four variables (String, String, Integer and List of Website Logs records), a list of objects or a specially devised data structure

i. List of (search phrase→performance metrics, source) which may for example be stored in a Map of (search phrase→List of object containing List of floating precision numbers and integers)

j. List of Keywords which may for example be stored as a List of strings (each keyword comprising a string).

k. A (Keyword, Invitation Cueing Set Name) pair which may for example be stored in two variables (String and String), a list of strings or a specially devised data structure

l. Invitation Cueing Set which may for example be represented by an ICS Id (integer) or as a List of Lists containing a List of positive keywords (strings), List of negative keywords (strings), List of invitations (a specially devised data structure based upon the Invitation Table record) and a Map of properties (Name→Value)

m. A (Invitation Cueing Set, Invitations) pair which may for example be stored in two variables (Invitation Cueing Set and a specially devised data structure based upon the Invitation Table record)

n. Possible Actions which may for example be stored as a list of strings

o. Conditions which may for example can be stored as a list of strings

Simplified pictorial illustrations of display screens useful for obtaining a website owner's validation of keywords are shown in FIGS. **9** and **10**. A Basic view is shown in FIG. **9** and a "Save to Paradigm" view is shown in FIG. **10**. Clicking on "Save to Paradigm" in the screen display of FIG. **9** brings up the screen display of FIG. **10**. In FIG. **9**, "select all" and "unselect all" serve to mark or unmark all records. "Reject" serves to remove select keywords from the table. "Save to Paradigm" serves to open the structuring pane of FIG. **10**. The leftmost column comprises selectable box icons. The table of FIG. **9** presents the results of the keyword expansion unit **1020**, say, of FIG. **1**, for website owner validation. The website owner is typically able to change certain parameters; in the illustrated embodiment the parameters the website owner is entitled to override are marked by "edit".

In FIG. **10**, the website owner can typically delete any of the "divide to invitation Cueing sets" rules by using the X option, and can add a new such rule by pressing "add". Arrows may be provided to allow the website owner to navigate up and down the list of invitation rules; such rules can typically be removed, or more can be added. The "start structuring" button allows the website owner to initiate the Paradigm structuring method of FIG. **5** or FIG. **6**.

Two examples of work sessions using the system of FIG. **1** are now described. Various states of the tables of FIGS. **7**A-**7**H are presented in FIGS. **11**A-**18**B.

Example 1

A first example workflow is now described with reference to FIGS. **11**A-**11**D, **12**A-**12**, **13**A-**13**E and **14**A-**16**B. Carmel, a website owner, is developing an application designed to increase the awareness to the US elections using the Internet. For this cause, Carmel establishes a website named voteintheunitedstates.com, which contains details on the candidates. Moreover, she wants to initiate a search engine sponsored Paradigm which will attract more US citizens to the website and hence to vote.

Carmel's website contains two pages, one for each of the following two candidates:

1. John Smith, a 45 year old Democrat, and
2. Sara Johnson, a 43 year old Republican

In order to create the Paradigm using the embodiment disclosed above, Carmel prepares the following Website Representation:

```
START OF XML FILE MySite.xml
<PAGE url=" voteintheunitedstates.com\JohnSmith.html">
   45, John Smith, male, democrat
</ PAGE>
< PAGE url="voteintheunitedstates.com\ SaraJohnson.html ">
   43, Sara Johnson, female, republican
</ PAGE>
END OF XML FILE
```

Carmel also predefines rules used by the methods of FIGS. **1**-**6**, such as the following rules R**1** to R**6**. Rules can be defined in any suitable format. Below the format of the split rule is Java Regular Expression. The expansion rule is formatted as a list of expansion tool. The other rules below use { } parentheses, with the attribute name in it, as a place-holder for an attribute value, as seen in the examples above.

```
R1 (Split Rule):
<PAGE.*</PAGE>
R2: Parse Rule
{ } is a placeholder sign;
<PAGE url={LandUrl}>
   {Age},{Name}, {Gender},{Party}
</ PAGE>
```

R**3**: Attributes2Keywords Rules

1. Vote {Name}
2. {Party} candidate

R**4**: Expansion Rules

1. Use FakeKeywordTool, an online free keyword expanding tool
2. Use a conventional Translator package; English French

R**5**: Divide to Invitation Cueing Set by Attribute Rule

Page. {Name} OR Source.ICS ID

R**6**: Invitation Rule

Vote For {Name}

Participate in the US Elections!

Vote for the {Party} candidate!

Voteintheunitedstates.com

She provides all of this data to the system of FIG. **1**. Keyword Extraction may be performed as per the method of FIG. **2**; Step **2040** (splitting MySite.xml to item description using the Split Rule), yields:

1. <PAGE url="voteintheunitedstates.com\JohnSmith.html">45, John Smith, male, democrat</PAGE>
2. <PAGE url="voteintheunitedstates.com\ SaraJohnson.html">43, Sara Johnson, female, republican<PAGE>

The per-description Loop **2050** is now performed for Item description #**1**. Step **2070** (Parsing item description using the Parse Rule), yields the following Attributes:

LandURL="voteintheunitedstates.com\JohnSmith.html"
Age=45
Name="John Smith"
Gender="male"
Party="democrat"

Step **2090** (Create a list of positive keywords using Attributes2Keywords Rules), yields:

Vote John Smith
Democrat candidate

Step **2100**: The state of the Sources Table of FIG. **7**D is as shown in FIG. **11**A. The state of the Pages Table of FIG. **7**A is as shown in FIG. **12**A. The state of the Positive Keywords Table of FIG. **7**B is as shown in FIG. **13**A. The state of the Page Attributes Table of FIG. **7**C is as shown in FIG. **14**A.

The Loop defined by step **2050** in FIG. **2** is now performed for Item description #**2**, including steps **2070**, **2090**, **2100** in FIG. **2**. The state of the Sources Table of FIG. **7**D is as shown in FIG. **11**B. The state of the Pages Table of FIG. **7**A is as shown in FIG. **12**B. The state of the Positive Keywords Table of FIG. **7**B is as shown in FIG. **13**B. The state of the Page Attributes Table of FIG. **7**C is as shown in FIG. **14**B.

Keyword Expansion is now performed as per the method of FIG. **4**. In the Loop defined by step **2130** in FIG. **3**A, the positive keyword=Vote John Smith. Expansion Rules R**4** as defined by Carmel are used to obtain expansion tools. Per-expansion rule Loop defined by step **3040** in FIG. **4** yields: Expanding Tool=FakeKeywordTool. In Step **3050**, this tool is used to find related keywords, e.g.: John Smith→(Governor Smith, voting Smith). After Step **3060** (Store), the state of the Sources Table of FIG. **7**D is as shown in FIG. **11**C and the state of the Positive Keywords Table of FIG. **7**B is as shown in FIG. **13**C. In the Per-expansion rule Loop defined by step **3040** in FIG. **4**, Expanding Tool=Translator—English to French. Following Steps **3050** and **3060**, the state of the Positive Keywords Table of FIG. **7**B is as shown in FIG. **13**D.

Following the loops defined by steps **3020** and **3040** of FIG. **4** for the rest of the keywords, the state of the Sources Table of FIG. **7**D is as shown in FIG. **11**D. The state of the Positive Keywords Table of FIG. **7**B is as shown in FIG. **13**C

Website owner validation may optionally be sought. Display screens e.g. those of FIGS. **9-10** may be displayed to Carmel to enable her to validate certain keywords and delete others. For instance, the keyword "Johnson Security LTD" is obviously not relevant for the Paradigm, so Carmel might want to delete it. Alternatively, as is assumed in the illustrated example, the system can continue automatically without seeking website owner validation.

Structuring of a Paradigm based on the above output is performed in accordance with the method of FIG. **5**A. Step **4020** (Select keywords with no Invitation Cueing Set ID), yields the following Keywords Ids: (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11). In the Per-keyword Loop defined by step **4030** in FIG. **5**A, keyword #**1**: Vote John Smith. In Step **4050** (Using Divide to Invitation Cueing Set by Attribute Rule R**5** as defined by Carmel), the Invitation Cueing Set Name is "John Smith". Step **4060** (Invitation Cueing Set Exists?) goes to No. This yields the state of Invitation Cueing Sets Table of FIG. **7**F shown in FIG. **15**A. After Step **4080** (Set the Invitation Cueing Set ID), the state of the Positive Keywords Table of FIG. **7**B is as shown in FIG. **13**E. Performing the Per-keyword Loop defined by step **4030** in FIG. **5**A including steps **4050-4080**, for the rest of the positive keywords, yields the state of the Invitation Cueing Set Table as shown in FIG. **15**B and the state of the Positive Keywords Table of FIG. **7**B as shown in FIG. **13**F. In the Loop defined by step **4100** in FIG. **5**A, Invitation Cueing Set #**1**: John Smith. In step **4120**: an invitation is created using the Invitation Rule R**6** defined by Carmel. This yields, for example, the following invitation:

Vote For John Smith
Participate in the US Elections!
Vote for the democrat candidate!
Voteintheunitedstates.com

In Step **4130**, the invitation is stored e.g. in a table of invitations. The state of the Invitations Table of FIG. **7**E is as shown in FIG. **16**A. The data shown stored in the data field of FIG. **16**A can be stored in separate fields, depending on the systems in which these invitations are presented. In the Loop defined by step **4100** in FIG. **5**A: Invitation Cueing Set #**2**: Sara Johnson. Performing Steps **4120-4130** for this Invitation Cueing Set yields the state of the Invitations Table of FIG. **7**E shown in FIG. **16**B.

Example 2

Another example workflow is now described, with reference to the tables of FIGS. **11**E-**11**F, **13**G-**13**I, **17** and **18**A-**18**B inter alia. It is appreciated that here as in other examples, these figures do not fully represent the states of various tables indicated, but rather only the states of new or relevant portions of these tables. It is assumed that the initial state of the system of FIG. **1** under Example 2 is the same as the final state of the system under Example 1. In Example 2, after running her Paradigm with the above Invitation Cueing Sets for some time, Carmel decides to use the system of FIG. **1** again, this time using her website's logs instead of MySite.xml as previously. To do so, Carmel defines three possible actions and two conditions: a positive condition PC**1** and a negative condition NC**1**.

Possible Actions: Click, Register, Vote

Positive Conditions: PC**1**: Register>0

Negative Conditions: NC**1**: clicks>2 AND Register=0 AND Vote=0

The logs may have the form illustrated in the table of FIG. **17**. "fakese.com" can be a known search engine with a known url of search: /?q={search phrase}, so the parsing is straightforward (+ sign stands for a space character). Initially, PC**1**-Register>0. Keyword extraction is performed as per the method of FIGS. **3**A-**3**B. In Step **2120** (Pick entries with search phrases), Ids=(1, 3, 4, 5, 6). In the Loop defined by step **2130** in FIG. **3**A, Entry #**1**: ID=1. In Step **2140**:

Search phrase="Voting John"
Source keyword ID=1
Cookie=8FGJ

In Step **2150**, later entries with the same user ID are found: Ids=(2). Step **2180** which uses the list of possible actions to compute performance metrics, yields:

Click=1
Register=1
Vote=0

In the Loop defined by step **2130** in FIG. **3**A, Entry #**2** is ID=3. Following steps **2140-2170**:

Click=2
Register=0
Vote=0

Continuing the Loop defined by step **2130** in FIG. **3**A for the rest of the keywords yields the following list:

(
(Voting John→ Click=1, Register=1, Vote=0, Source=1)
(Stop Vote John Smith → Click=2, Register=0, Vote=0, Source=1)
(Stop Vote John Smith → Click=1, Register=0, Vote=0, Source=1)
(Republican Party → Click=1, Register=0, Vote=1, Source=1)
)

Step **2190** (Aggregate) yields:

(
(Voting John→ Click=1, Register=1, Vote=0, Source=1)
(Stop Vote John Smith → Click=3, Register=0, Vote=0, Source=1)
(Republican Party → Click=1, Register=0, Vote=1, Source=1)
)

Step **2210** uses condition PC**1** to choose search phrases and yields:

(Voting John)

After Step **2220** (Positive condition), the state of the Sources Table of FIG. **7**D is as shown in FIG. **11**E. The state of the Positive Keywords Table of FIG. **7**B is as shown in FIG.

13G. Keyword Expansion is now performed as per the method of FIG. **4**. After running the two loops of FIG. **4** (as defined by steps **3020** and **3040**), as before, the state of the Sources Table of FIG. **7**D is as shown in FIG. **11**F and the state of the Positive Keywords Table of FIG. **7**B is as shown in FIG. **13**H. Optional Website owner's validation, e.g. using the screen displays of FIGS. **9-10**, is followed by Paradigm structuring e.g. as per the method of FIGS. **5**A-**5**B. Steps **4010** and **4020** (Select positive keywords with no Invitation Cueing Set ID) yield: Keyword ID=12. In the Loop defined by step **4030** in FIG. **5**A, Keyword ID=12.

Step **4050** (Using Divide to Invitation Cueing Set by Attribute Rule R**5** as defined by Carmel) yields: Source. Invitation Cueing Set ID. The Invitation Cueing Set Name is "John Smith". Step **4060** (Invitation Cueing Set (ICS) Exists?) goes to No. After Step **4080**, the state of the Positive Keywords Table of FIG. **7**B is as shown in FIG. **13**I. The Loop defined by step **4100** in FIG. **5**A is performed. There is no new Invitation Cueing Set so the loop ends.

The NC**1** condition defined by Carmel is now processed. Steps **2120-2190** of FIG. **3**A are performed, yielding:

```
(
(Voting John→ Click=1, Register=1, Vote=0, Source=1)
(Stop Vote John Smith → Click=3, Register=0, Vote=0, Source=1)
(Republican Party → Click=1, Register=0, Vote=1, Source=1)
)
```

Step **2210** (Select by condition NC**1**) yields:
(Stop Vote John Smith)

After Step **2220** is performed (Negative condition), the state of the Negative Keywords Table is as shown in FIG. **18**A. Structuring is then performed in accordance with the method of FIG. **6**. The Loop defined by step **4150** in FIG. **6** yields Keyword ID=1. In Step **4160**: The Invitation Cueing Set ID of source of the keywords=1. After Step **4170**, the state of the Negative Keywords Table of FIG. **7**H is as shown in FIG. **18**B.

The input to the system shown and described herein may comprise a set of pages with URLs differentiated by numerical values of any range. The set of pages may include at least one valid page and at least one invalid page, and at least some of the valid and invalid pages may be identified by the same range of numeric values. A keyword set generator, using any of the methods shown and described above, may include a numerical value range processor operative to identify all sequences of numeric values containing at least one valid page, and to identify and skip invalid pages.

Digital input to the system shown and described herein may comprise a website with more than one URLs, each such URL having a numeric ID field uniquely identifying a corresponding page. A numerical value range processor may define a range of numeric ID fields which includes all of the numeric ID fields in the website, to check all pages in the range for validity.

FIG. **19** is a simplified flowchart illustration of a method for numerical crawling which is constructed and operative in accordance with certain embodiments of the present invention. The input to the method of FIG. **19** may include a Basic URL (a URL on top of which the ID parameter is to be placed), an ID field (the name of the ID parameter), a First ID (the first ID to try), a Last ID (the last ID to try), and a Validation Rule which is used to check that a particular webpage is a valid page, and can serve as an item description. The validation rule may be provided in any suitable format, such as Java Regular Expression.

The method of FIG. **19** typically includes some or all of the following steps, suitably ordered e.g. as illustrated:

Step **21010**: For each number in the range [{First ID}. {Last ID}]

Step **21020**: Construct a URL of the form URL={Basic URL}?{ID field}={number}.

Or, if other parameters already exist, URL={Basic URL}&{ID field}={number}.

Step **21030**: Fetch the page with the above URL.

Step **21040**: Validate the page using the validation rule. For instance if the rule is a Java Regular Expression, search for the expression. A valid page is one in which the expression was found.

Step **21050**: Is page valid?

Step **21060**: If yes, continue with steps **2060-2100** using the page as an item description.

Step **21070**: End loop.

The steps of FIG. **19** may replace steps **2010-2050** and **2110** and are particularly advantageous in those applications in which less than all of the integer values in the provided range are valid. The split rule is replaced, in the embodiment of FIG. **19**, by the URL construction which in fact can also be regarded as a rule, as it instructs the Extract Keywords process how to construct the URL. The rule can be more general and allow the integer number to appear not only as a parameter but also in other parts of the URL. Alternatively or in addition, the validation steps of FIG. **19** may be added to the method of FIG. **2**. The validation rule may vary. One possible rule is to provide a fixed string to search in the page. Another possible rule is to provide a Java Regular Expression, as in the illustrated embodiment. These two possibilities are not intended to be limiting.

Example 3

An Example work session which utilizes the method of FIG. **19** is now described. Carmel has created a new website for encouraging US citizens to vote in the US elections. It contains one page, voteintheunitedstates.com/index.jsp, which is dynamic and has a parameter named "candidate_id". Given the value of this parameter the resulting form of the page is:

candidate_id=1: (voteintheunitedstates.com/index.jsp?candidate_id=1)

The above may be a page describing a first candidate, John Smith, and containing his picture, some details about him (as in the examples above) and a button named "press here to register for the elections".

candidate_id=2: (voteintheunitedstates.com/index.jsp?candidate_id=2)

The above may be a page describing a second candidate, Sara Johnson, containing her picture, some details about her (as in the examples above) and a button named "press here to register for the elections".

For any other value (for instance candidate_id=13) the page may show the following message:

"Sorry, you have reached a missing candidate's page".

Carmel provides the following inputs to steps **21010-21060** of the method of FIG. **19**:

Base URL="voteintheunitedstates.com/index.jsp?"; ID field="candidate_id"

First ID=1; Last ID=3; Validation rule="press here to register for the elections".

Carmel then starts running the system, yielding the following results:

Step **2010**: (For each number in the range [{First ID} . . . {Last ID}]) number=1

Step **2020**: (Construct a URL)
URL="voteintheunitedstates.com/index.jsp?candidate_id=1"
Step **21030**: Fetch the page with that URL
Page=page of John Smith
Step **21040**: (Validate page)
Look for "press here to register for the elections"—Found
Step **21050**: (Is page valid?)—Yes
Step **21060**: (If yes, continue with steps **2060-2100**)
Parse the page of John Smith (similar to Example 1)
Step **2010**: (For each number in the range [{First ID}. {Last ID}]) number=2
Step **2020**: (Construct a URL)
URL="voteintheunitedstates.com/index.jsp?candidate_id=2"
Step **21030**: Fetch the page with that URL
Page=page of Sara Johnson
Step **21040**: (Validate page)
Look for "press here to register for the elections"—Found
Step **21050**: (Is page valid?)—Yes
Step **21060**: (If yes, continue with steps **2060-2100**)
Parse the page of Sara Johnson (similar to Example 1)
Step **2010**: (For each number in the range [{First ID} . . . {Last ID}]) number=3
Step **2020**: (Construct a URL)
URL="voteintheunitedstates.com/index.jsp?candidate_id=3"
Step **21030**: Fetch the page with that URL
Page=page containing message "Sorry, you have reached a missing candidate's page"
Step **21040**: (Validate page)
Look for "press here to register for the elections"—Didn't Find
Step **21050**: (Is page valid?)—No

A particular advantage of certain embodiments of the system shown and described herein is that the total site crawling capability provided is very general and enables almost all relevant websites having a wide variety of site structures, to be crawled. The system shown and described herein is particularly useful in applications in which a website representation is used to construct an initial paradigm. A paradigm updating process is scheduled periodically, such as daily or weekly, in the course of which the website logs of the website accumulated in the relevant period are analyzed by the system, such that beneficial search terms appearing therein can be added constantly as positive keywords whereas keywords which have harmed the performance of the paradigm can be marked as negative keywords.

It is appreciated that software components of the present invention including programs and data may, if desired, be implemented in ROM (read only memory) form including CD-ROMs, EPROMs and EEPROMs, or may be stored in any other suitable computer-readable medium such as but not limited to disks of various kinds, cards of various kinds and RAMs. Components described herein as software may, alternatively, be implemented wholly or partly in hardware, if desired, using conventional techniques.

Included in the scope of the present invention, inter alia, are electromagnetic signals carrying computer-readable instructions for performing any or all of the steps of any of the methods shown and described herein, in any suitable order; machine-readable instructions for performing any or all of the steps of any of the methods shown and described herein, in any suitable order; program storage devices readable by machine, tangibly embodying a program of instructions executable by the machine to perform any or all of the steps of any of the methods shown and described herein, in any suitable order; a computer program product comprising a computer useable medium having computer readable program code having embodied therein, and/or including computer readable program code for performing, any or all of the steps of any of the methods shown and described herein, in any suitable order; any technical effects brought about by any or all of the steps of any of the methods shown and described herein, when performed in any suitable order; any suitable apparatus or device or combination of such, programmed to perform, alone or in combination, any or all of the steps of any of the methods shown and described herein, in any suitable order; information storage devices or physical records, such as disks or hard drives, causing a computer or other device to be configured so as to carry out any or all of the steps of any of the methods shown and described herein, in any suitable order; a program pre-stored e.g. in memory or on an information network such as the Internet, before or after being downloaded, which embodies any or all of the steps of any of the methods shown and described herein, in any suitable order, and the method of uploading or downloading such, and a system including server/s and/or client/s for using such; and hardware which performs any or all of the steps of any of the methods shown and described herein, in any suitable order, either alone or in conjunction with software.

Features of the present invention which are described in the context of separate embodiments may also be provided in combination in a single embodiment. Conversely, features of the invention, including method steps, which are described for brevity in the context of a single embodiment or in a certain order may be provided separately or in any suitable subcombination or, in a different order. "e.g." is used herein in the sense of a specific example which is not intended to be limiting.

The invention claimed is:

1. A system for identifying negative keywords, the system comprising:

a non-acquiescence information collector configured to
identify, for each individual website from among a multiplicity of websites, at least one keyword associated with an interaction between at least one user and the individual website, and
determine that the interaction did not result in acquiescence of the user to at least one suggestion presented by said website;

a negative keyword definer operative to classify the keyword, responsive to the non-acquiescence information collector determining that the interaction between the user and said website did not result in acquiescence of said user to the suggestion presented by said website, as a negative keyword associated with said website; and

a paradigm structuring unit configured to cue an invitation display system to refrain from displaying invitations to said website when the negative keyword is used in a search phrase provided to a search engine,

wherein said non-acquiescence information collector, said negative keyword definer, and said paradigm structuring unit are implemented in any of
a) computer hardware, and
b) computer software embodied in a non-transitory, computer-readable medium;
wherein the non-acquiescence information collector is configured to determine that the interaction did not result in acquiescence of the user by determining that a conversion did not occur as a result of the interaction, wherein the conversion is selected from the group consisting of: a user registration, a user vote, and a user purchase.

2. A method for identifying negative keywords, the method comprising:

identifying, for each individual website from among a multiplicity of websites, at least one keyword associated with an interaction between at least one user and the individual website;

determining that the interaction did not result in acquiescence of the user to at least one suggestion presented by said website;

classifying the keyword, responsive to determining that the instance of the user contact with said website did not result in acquiescence of said user to the suggestion presented by said website, as a negative keyword associated with said website and;

cueing an invitation display system to refrain from displaying invitations to said website when the negative keyword is used in a search phrase provided to a search engine,

wherein said identifying, determining, classifying, and cueing are implemented in any of

a) computer hardware, and

b) computer software embodied in a non-transitory, computer-readable medium;

wherein the determining step comprises determining that a conversion did not occur as a result of the interaction, wherein the conversion is selected from the group consisting of: a user registration, a user vote, and a user purchase.

* * * * *